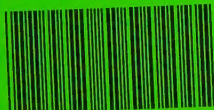


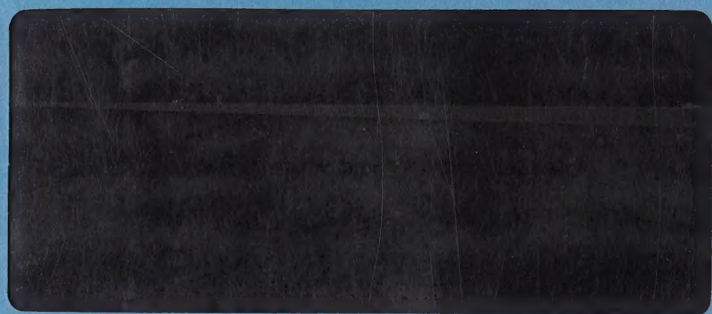


MP MASTER



MA30022

FAIRCHILD
ELECTRO-METRICS
CORPORATION



X-Y PLOTTER

MODEL EXY-250

*Part of
N545824*

Fairchild/Electro-Metrics Corporation
100 Church Street
Amsterdam, New York
12010

MANUAL REVISION NOTICE*

ELECTRONIC ASSOCIATES INC.
LONG BRANCH NEW JERSEY

PAGE	ITEM PARA	REVISION
		Under dynamic conditions, jitter of the servo system can be the result of oil and dirt deposited on the linear feedback potentiometer (mandrel) by touching it and/or by continued use in a dusty or otherwise polluted atmosphere. When dirt is suspected, expose the mandrel for cleaning. Use the spray container of contact cleaner included with the VARIPLOTTER (EAI part number 00 926 Q51 0). Spray directly on the mandrel to remove light dust deposits; spray, then wipe with the included foam material (EAI part number 00 956 214 0) for more thorough cleaning. Wipe perpendicularly to the potentiometer length to remove dirt packed between windings.
DATE I/25/67	MANUAL TITLE All VARIPLOTTER Manuals	
* THIS MANUAL REVISION NOTICE IS ISSUED TO INCORPORATE IMPROVEMENTS OR CHANGES OF ROUTINE OR MINOR NATURE IN THE SUBJECT MANUAL.		REVISION NOTICE NO. 05-66-27a SH. I OF I SH.

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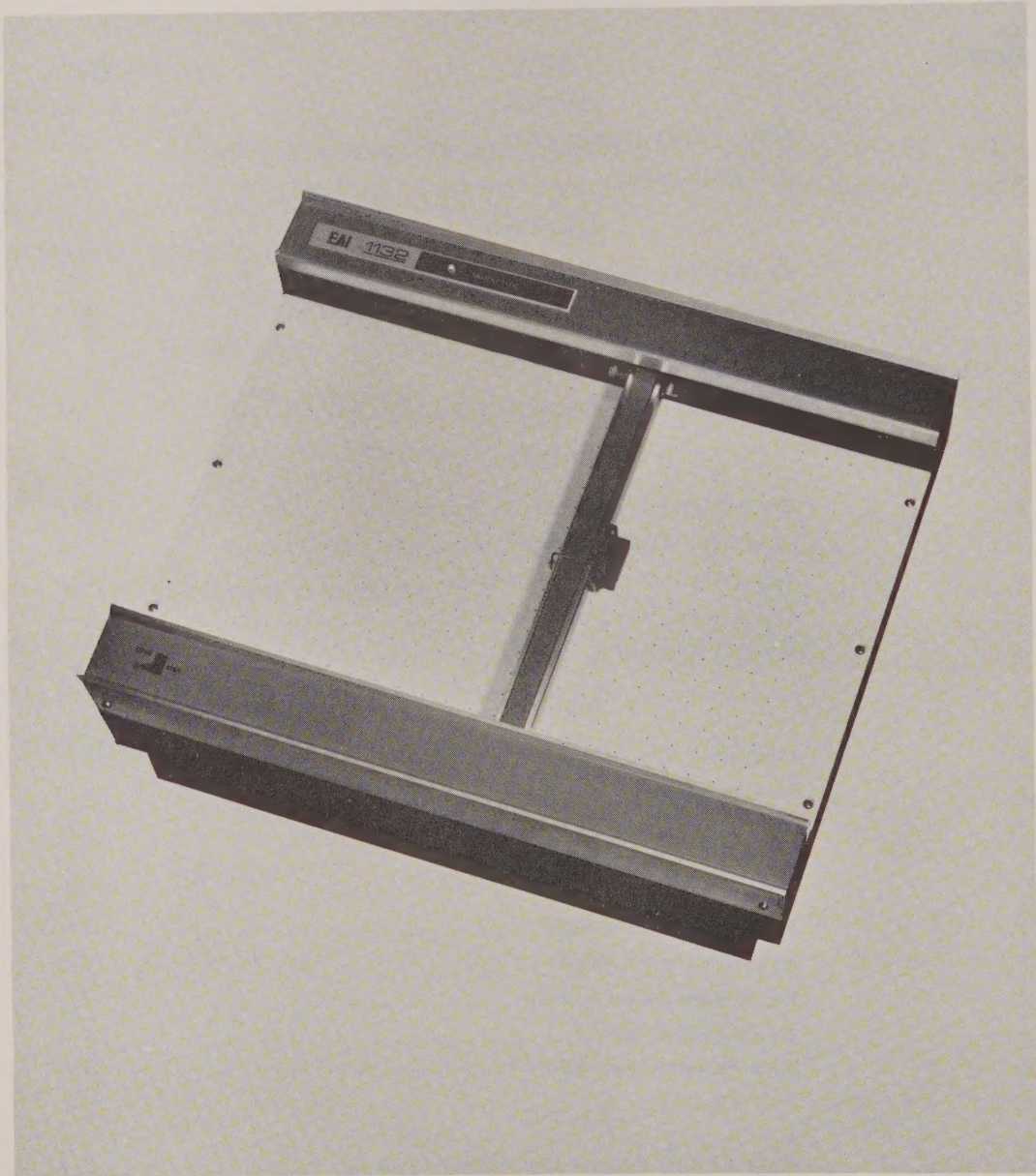


Figure 1. Series 1132 VARI PLOTTER

SECTION 1

INTRODUCTION

The EAI 1132 VARIPLOTTER[®] X-Y Recorder (Figure 1) is a portable analog recorder which plots rectangular co-ordinate graphs from electrical analog inputs.

Data may be plotted as either a continuous inked curve, or as points along the contour of the curve (point plotting).

The 1132 VARIPLOTTER has expansion capabilities which provide for other than dc inputs. With the EAI 5.46.0001 Accessory Unit, plug-in modules permit plotting ac, log (ac or dc), log-log and ac-log functions.

Curves may be plotted on standard 11×17 inch or $8\text{-}1/2 \times 11$ inch chart paper held to the surface by a vacuum blower system.

Controls provided for both the pen and arm servos (the ZERO controls) permit positioning the (0, 0) coordinates to any location within the plotting surface.

A fixed input impedance and input sensitivity (scale factor) are provided for either inch or centimeter chart paper (see addendum for specific scale factor provided).

1. INSTALLATION

The VARIPLOTTER is ready for operation (described in Sections 3 and 4) as soon as unpacking is completed. The unit, supplied with four rubber feet for table top use, may be rack mounted if desired.

The VARIPLOTTER is provided with four mounting holes (two on either side of the casting) permitting the plotter to be mounted in an EIA standard 19-inch rack. Two persons are required for the installation. Remove the upper and lower decorative covers; position the plotter so that the mounting holes on both sides of the plotter coincide with the threaded rack holes. Insert the 10-32 mounting bolts in the mounting cams. Position the cams in the rack mounting holes; secure the bolts to the rack. The cams are flanged and the mounting hole is elongated to permit the cams to be rotated (allowing correct positioning of the mounting bolts). When the cam is seated, its flange will be flush with the frame. Figure 2 shows a properly seated cam (with the mounting bolt removed).

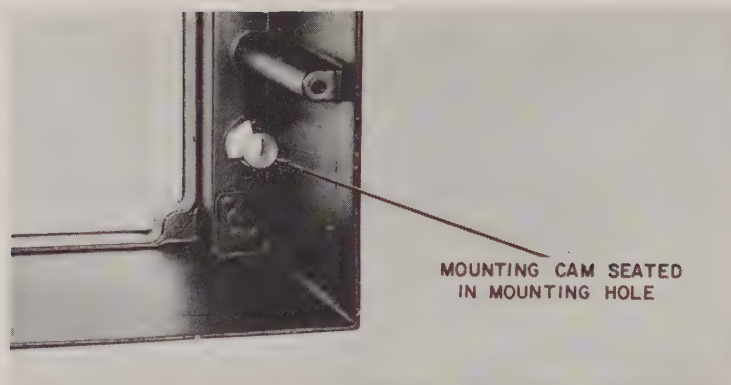


Figure 2. Cam Installation

2. 115/230 VOLT CONVERSION

The power transformer has a dual 115 volt primary that can be series or parallel switch selected for 115 or 230 volt operation. The switch is accessible through an access hole on the bottom surface of the VARILOTTER. Use a small, flat blade screw driver to flip the slider. Exercise obvious caution, and prevent applying 230 volts when switched for 115.

SECTION 2

SPECIFICATIONS

1. PHYSICAL CHARACTERISTICS

Height	6-1/2 Inches
Length	15-3/4 Inches
Width	19 Inches
Weight	29 Pounds (Approximately)

2. ELECTRICAL SPECIFICATIONS

Power	115/230V $\pm 10\%$, 50/60 Hz, Single Phase 115 VA Maximum
Ambient Temperature Range	5°C to 35°C With a Maximum Relative Humidity of 95%

Scale Factor and Input Impedance: The EAI 1132 VARIPLOTTER provides an input scale factor and impedance tailored to customer requirements. Scale factor sensitivity from 1 mv/in to 20v/in and input impedance to one megohm are available. (See addendum for specific scale factor provided.)

Slewing Speed	20 Inches/Second 50 Centimeter/Second
Static Accuracy	$\pm 0.1\%$
Dynamic Accuracy	At 10 Inches/Second: $\pm 0.2\%$ Maximum At 5 Inches/Second: $\pm 0.1\%$ Maximum
Repeatability	$\pm 0.05\%$

SECTION 3

PRELIMINARY OPERATIONS

This section provides the operator with preliminary procedures for normal plotter operation.

1. WARM-UP TIME

To insure VARIPLOTTER stabilization, the power switch should be placed in the STANDBY position for at least 30 minutes before operating the plotter.

2. PAPER INSTALLATION

The Series 1132 VARIPLOTTER is designed to accept standard 11×17 inch chart paper. The plotting area is a 10×15 inch (25×38 centimeter) rectangle (plotting area of standard 11×17 inch paper) when the plotting area of the paper is centered on the board.

To install graph paper proceed as follows:

1. Connect the power cord to the correct power source (115 volts or 230 volts, 50/60 Hz).
2. Place the PWR switch in the STBY position. Move the arm clear of the plotting area.
3. Accurately align the bottom edge of the graph paper with the guide rail; align the left-hand edge of the graph paper with the roll pin (located on the lower left of the plotting surface).
4. Smooth out the graph paper. Because accurate alignment primarily depends on the accuracy of the paper, chart paper supplied with the VARIPLOTTER is manufactured to special tolerances under rigid quality control standards; it is recommended that EAI chart paper be used with the VARIPLOTTER.

3. INSTALLATION OF INK CARTRIDGE

Refer to Figure 1 for ink cartridge installation procedure. The cartridge may leak a small quantity of ink at the instant of puncture, but will form a tight seal when pressed firmly into position.

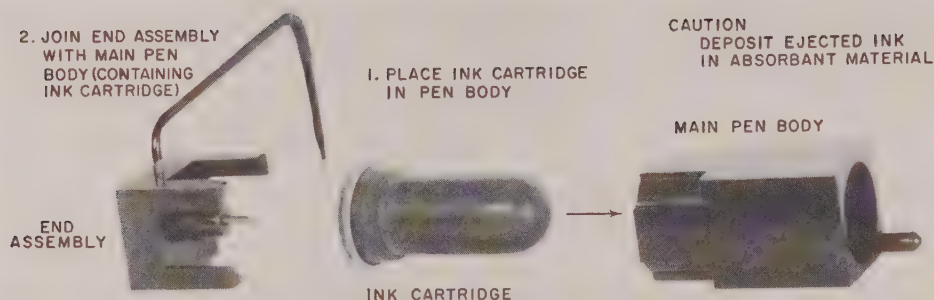


Figure 1. Ink Cartridge Installation

CAUTION

Ambient conditions can create pressure in a sealed ink cartridge and cause ink to be ejected from the pen stylus as the cartridge is punctured. Take precautionary measures by directing the stylus towards a piece of cloth, a blotter or other absorbent material.

4. PEN INSTALLATION

The procedure for installing the pen assembly in the pen carriage is illustrated in Figure 2. Place the pen assembly pivot points against the installation guide ramp. Push the pen assembly downward on top of the pivot springs until the pivot points seat firmly in the carriage.



Figure 2. Pen Installation

SECTION 4

NORMAL OPERATION

This section describes techniques of plotter operation. It includes a table of the Remote Connector pin functions, Operating Controls and suggested Operator Maintenance.

1. INPUTS

Each axis has the capability of being connected in a single ended grounded or floating input configuration. For single ended grounded inputs, connect the COMMON terminals to $\pm$ GND; for floating inputs use only the INPUT and COMMON terminals. Use shielded wire for each floating input lead, and connect the shields to the $\pm$ GND terminal.

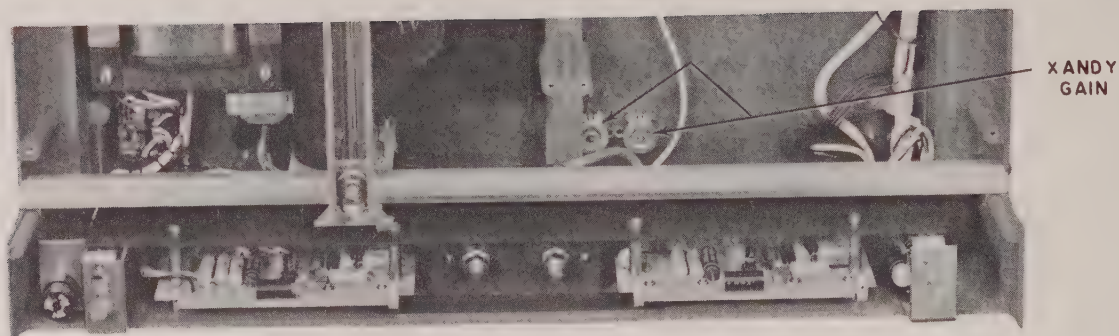
The input connector is located on the bottom surface of the VARIPLOTTER. See Table 1 for pin connections.

Table 1. 1132 Remote Connector

<u>Function</u>	<u>Connector Pin Designation</u>
X (Arm Input)	A
Y (Pen Input)	C
$\pm$ GND	E
Pen Lift Coil (Switched)	H
X (Arm Common)	L
Y (Pen Common)	N
-24V Pen Lift Voltage	X

2. OPERATING CONTROLS

Operating controls are those mounted on or just behind the front panel and are shown in Figure 1. They are most frequently used and are described in Table 2. Controls that are factory calibrated and rarely reset are described in Section 8.



NOTES:

1. ZERO CONTROLS ARE EXPOSED BY REMOVING THE LOWER DECORATIVE COVER (PULL STRAIGHT UP).
2. X AND Y GAIN CONTROLS ARE VARIED WITH A FLAT BLADE SCREWDRIVER. X GAIN IS LOCATED ON THE RIGHT.
3. PHOTO SHOWS OPTIONAL PEN SWITCH AND VARIABLE X AND Y INPUT ATTENUATOR.

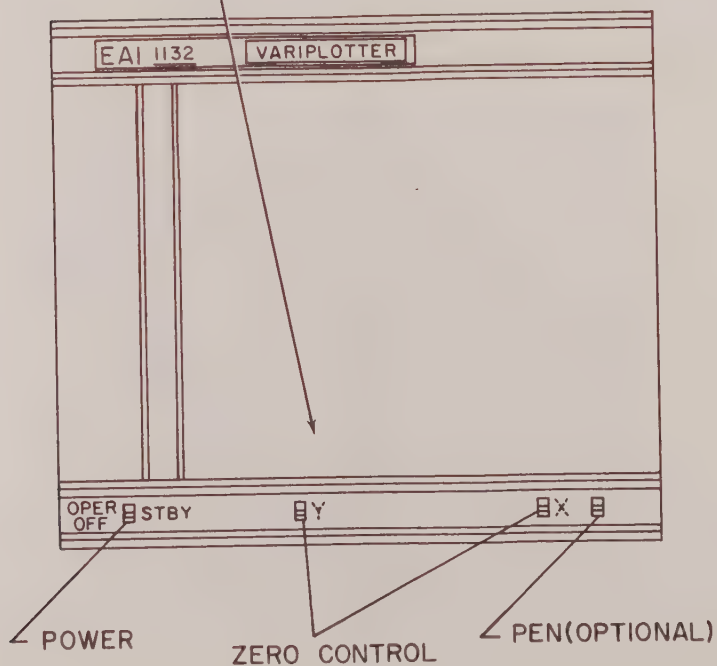


Table 2. 1132 Control Functions

Control	Description	Note
POWER	Controls the application of primary power; three position, two color, illuminated.	See Table 3 for further details.
PEN	Optional Extra	See addendum if ordered.
X ZERO	Provides the operator with manual control of the X (Arm) axis.	The X and Y ZERO controls permit positioning to any point within the plotting area.
Y ZERO	Provides the operator with manual control of the Y (Pen) axis.	
X GAIN	Arm Servo Amplifier Gain Adjustment	See Section 4-3-(1) for adjustment procedure.
Y GAIN	Pen Servo Amplifier Gain Adjustment	

NOTE

Access to X and Y ZERO controls can be made by pulling the decorative cover straight up.

Table 3. Power Switch Position Functions

Switch Position	Indicator Light	Power Function	Vacuum Function
OFF	OFF	Primary power removed from all plotter circuits.	
STBY	AMBER	Primary power applied to the 10.349 Power Supply (which in turn applies dc to all circuits) and the reference supplies. In this state, the servo reference windings are de-energized as is the chopper drive voltage for the servo amplifiers.	Primary power applied to the vacuum motor.
OPER	GREEN	Servo reference phase and chopper drive are energized. Pen and Arm servo's can be driven by input signals.	Primary power applied to the vacuum motor.

3. MAINTENANCE

The maintenance suggested here is of the operator type; that is, minor maintenance designed to be performed by the operator to insure peak plotter performance. The primary consideration will be (1) servo amplifier gain and the closely related (2) nulling accuracy check. Also

included are procedures for (3) cleaning the linear feedback potentiometer. No rigid schedule is suggested for these maintenance procedures; the operator can determine when and if maintenance is necessary.

1. The amplifier gain controls have been designed to be non-critical and easily adjusted; their necessity for readjustment can be determined by recognizing the result of extreme high and low gain settings. Too high a gain setting causes the servo system to become unstable - to oscillate in a jittering motion. A low gain setting causes the servo system's null point to feel *soft* when physically forced away from null.

Adjust the gain to a point of *firm* feel below the point of jitter. The gain adjustment can be further refined with the nulling accuracy procedures which follow.

2. Use the ZERO controls to position the pen to a convenient spot near the center of the board. Print two successive dots, one on top of the other. Measure the maximum distance inscribed by the two dots with an Optical Comparator.*

Slightly (1/8 inch) reposition the pen stylus with the Y axis ZERO control.

With the fingers, move the pen carriage slightly in one direction (1/8 inch). Do not release, but *slowly* allow it to return to null. Print a dot. Repeat, moving the pen in the opposite direction. Print a second dot. Measure the maximum distance inscribed by the two dots (this second measurement will be larger than the first). Subtract the smaller distance from the larger. This is the pen nulling accuracy specification and should be a maximum of 0.01 inch. Choose a gain setting as low as possible, yet one high enough to meet the specified accuracy.

Repeat the procedure measuring the arm static accuracy. The maximum specification for arm is 0.015 inch.

3. Under *dynamic* conditions, jitter of the servo system can be the result of oil and dirt deposited on the linear feedback potentiometer by touching it, and/or by continued use in a dusty or otherwise polluted atmosphere. When dirt is suspected, remove the upper decorative cover and clean the wire wound linear feedback potentiometer. Use a can of contact cleaner (included with the VARIPLOTTER, follow instructions on can). The potentiometer can also be dry cleaned with a fine bristle brush (such as a typewriter brush). Brush perpendicularly to the potentiometer length to remove dirt packed between windings.

NOTE

Never lubricate the stainless steel arm rail; if oily dust should gather, wipe with a soft cloth.

*Edmund Scientific No. 30169 (Edmund Scientific Co., 101 East Cloucester Pike, Barrington, New Jersey).

SECTION 5
MECHANICAL CALIBRATION

The EAI Series 1132 VARIPLOTTER has been accurately calibrated both mechanically and electrically under carefully developed factory procedures. The following recommended field maintenance procedures are based on those factory procedures.

1. POTENTIOMETER BRUSH - CONTACT PRESSURE

The linear feedback potentiometer wiper brushes (see Figure 1) are factory set and should not require readjustment. However, should replacement be necessary, the X axis (arm) brush assembly must be positioned to exert 35 to 40 grams* pressure on the linear feedback potentiometer. The Y axis (pen) brush is factory adjusted for 25 to 30 grams pressure. This non-adjustable brush assembly is secured with two screws for proper alignment.

NOTE

Do not attempt to alter the basic form of the brush.

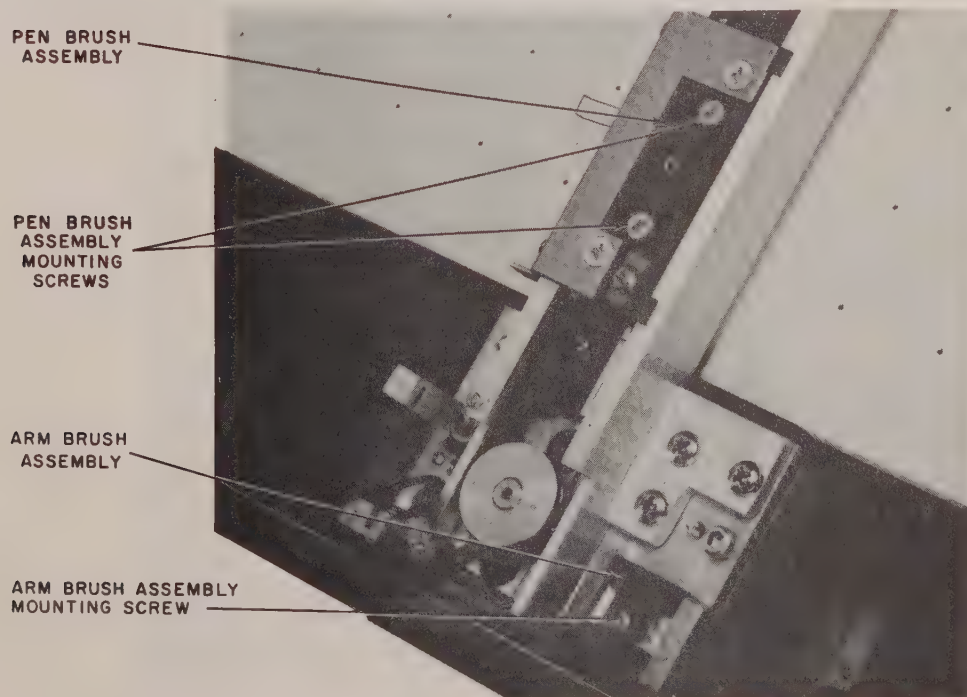


Figure 1. Pen and Arm Potentiometer Brushes

*GEC Number GT-1102 Gram Gauge, IMTRA Corporation, 11 University Road, Cambridge 38, Massachusetts

2. DRIVE TENSION - ARM

Calibration of tape tension for the arm drive system is demonstrated in Figure 2. Remove the plotting surface and move the arm beam to the left. Measure the distance from the top of the support rib casting, located in the center of the plotter, to the upper loop of the drive tape. Add $3/8$ inch to this measurement, then use a postal type ounce scale (EAI 00 777 0209 1) to measure the force necessary to lift the upper tape loop to the new height. The spring scale should register $3-1/4$ ounces $\pm 1/4$ ounce. If necessary, adjust the tape tension control as demonstrated in Figure 3. Rotate the control clockwise for an increase in tension.

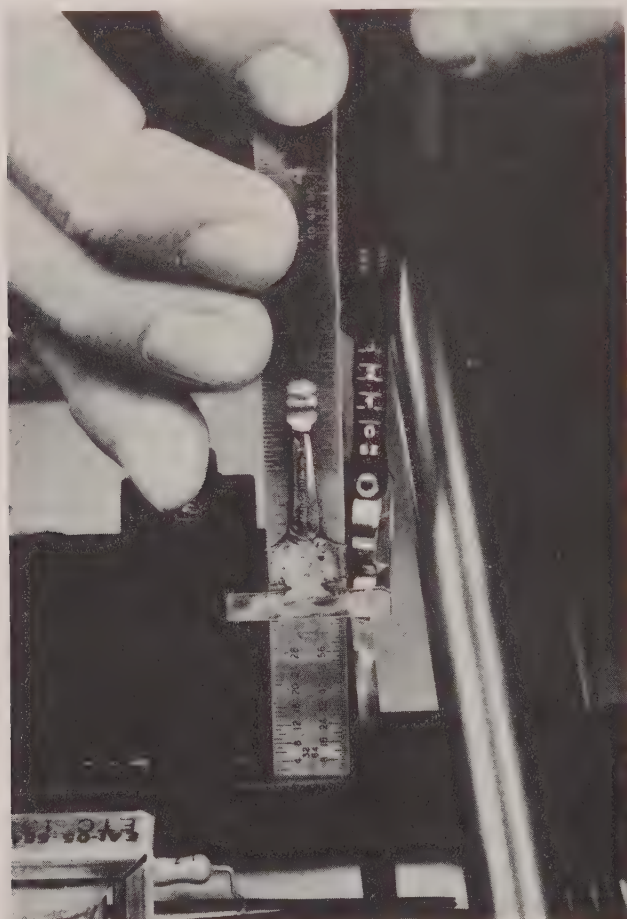


Figure 2. Arm Drive Tape Tension

3. DRIVE TENSION - PEN

Remove the pen lift cover. The pulley (Figure 4) closest to the plotter front panel is adjustable. To perform this test, lock the pen-drive pulley (with an Allen wrench held in the drive pulley's set screw); connect a pound scale to the pen carriage assembly. Pull the pen carriage with the scale until $3/4$ pound registers. Adjust the cable tension until the drive cable just begins to slip at the $3/4$ pound tension.



Figure 3. Adjustment, Tape Drive Tension

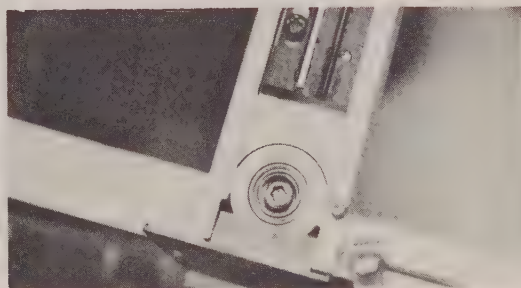


Figure 4. Adjustment, Pen Drive Tension

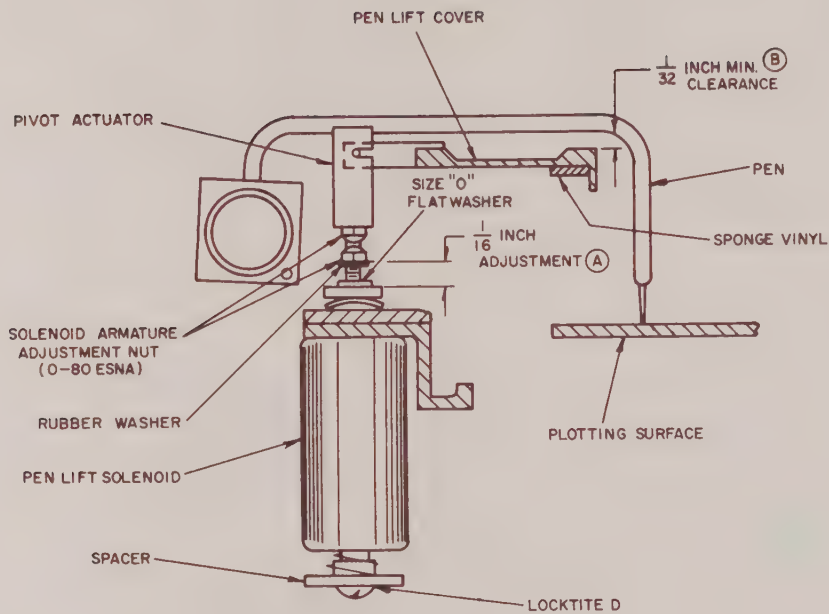
4. GUIDE RAIL PAPER SQUARING

The EAI Series 1132 VARIPLOTTER has been equipped with a dual function guide rail. It serves as the track on which the lower end of the arm beam rides, and it is used as the paper guide (in conjunction with the roll pin on the plotting surface).

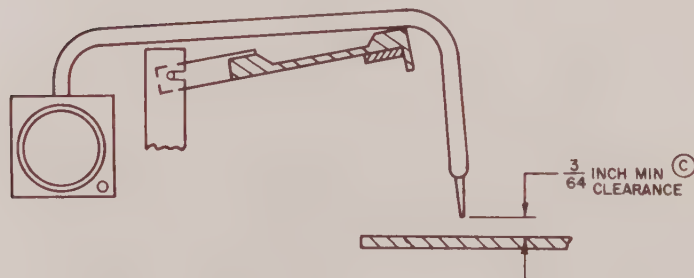
To align the paper guide rail, install a sheet of graph paper and draw a horizontal line (with the ZERO controls) across the full width of the plotting area. The line should be coincident with a horizontal grid line over the entire length to ± 0.005 inch. If the line does not meet this specification, loosen the Allen screws at either end of the paper guide rail and reposition the rail and paper until the specification is met.

5. PEN LIFT COVER ELEVATION

Pen lift adjustments are made at two points in the system: the pivot actuator and the lower 0-80 ESNA nut. The upper 0-80 ESNA nut is a locknut for the pivot actuator. See Figure 5.



(a) Plotting Position



(b) Pen Up

Figure 5. Pen Lift Mechanism

Adjust the pen lift system by (1) rotating the 0-80 ESNA nut for adjustment (A), by (2) rotating the pivot actuator for clearance (B) and by rotating the lower 0-80 ESNA nut for clearance (C)

NOTE

The pen lift cover must be removed before pivot actuator rotation is possible. Be sure to lock the pivot actuator with the upper 0-80 ESNA nut.

SECTION 6

MECHANICAL DISASSEMBLY

The following paragraphs describe the procedures for removing items from the VARIPLOTTER to provide access to plotter components for maintenance and calibration. In order to replace components on the 10.349 Power Supply board, it is necessary to remove both the plotting surface and bottom cover.

1. PLOTTING SURFACE REMOVAL

Remove the six counterbored screws located on the top of the plotting surface. Move the plotting arm to the right; slide the plotting surface to the left (Figure 1) until the right-hand side can be raised (Figure 2), thus exposing the circuit board.

NOTE

It is necessary to slightly raise the left-hand side of the plotting surface to gain sufficient left-hand movement.

DEMONSTRATED ON AN EAI SERIES 1133 VARIPLOTTER.

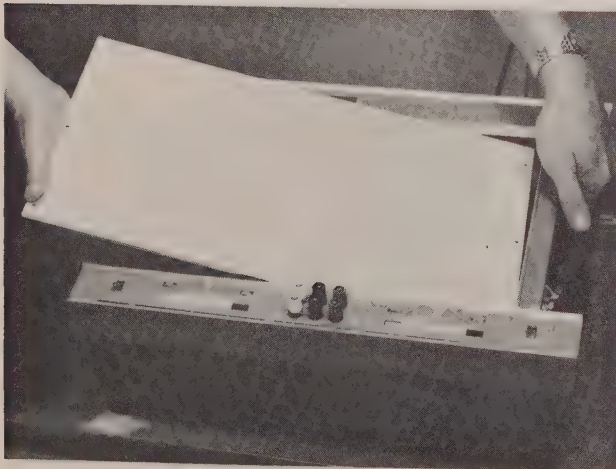


Figure 1. Plotting Surface Removal (a)

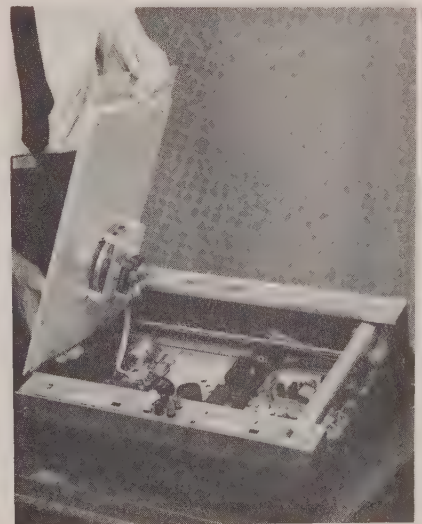


Figure 2. Plotting Surface Removal (b)

2. DECORATIVE COVERS - UPPER AND LOWER

The upper decorative cover is held to the frame with two screws. Simply remove the screws to remove the covers. To remove the lower decorative cover, pull straight up.

3. PEN LIFT COVER

The pen lift cover is removed by first removing the upper and lower decorative covers. This will expose the pen lift cover retaining strips. Remove these strips (each is held in place by a single screw). The cover can now be carefully removed from its pivoting grooves.

4. POTENTIOMETER BRUSH - PEN

The brush for the pen linear feedback potentiometer is located just beneath the pen lift cover inside the arm beam. Remove the pen lift cover. The brush assembly, part of the pen carriage assembly, is held in place with two screws. Figure 3 shows a removed brush assembly.

5. POTENTIOMETER BRUSH - ARM

The brush for the arm linear feedback potentiometer is located on the arm beam beneath the upper decorative cover.

Remove the upper decorative cover. The brush assembly is held in an adjusted position by a single screw; remove the screw to remove the brush assembly. When replacing a brush assembly, be sure to follow the adjustment procedure of Section 5-1.

6. BOTTOM COVER

The bottom cover is mounted to the plotter frame with five screws. Simply remove the screws to remove the cover.

NOTE

The four corner screws (with a single star washer each) provide the necessary mechanical stability; the fifth, with two outside star washers, is used as an electrical ground connection. Be sure to place an outside star washer (1) between the 10.349 Power Supply board and the bottom cover, as well as (2) between the bottom cover and screw head.

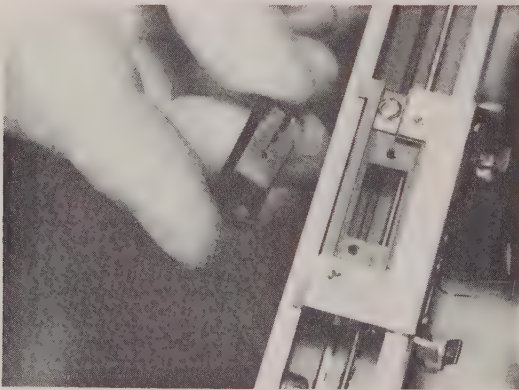


Figure 3. Pen Brush Assembly

SECTION 7

THEORY OF OPERATION

1. POWER SUPPLY

Refer to Schematic Drawing D00 010 0349-1 0S for the following description:

The VARIPLOTTER incorporates a transformer type, zener referenced power supply. Power transformer T3 has a dual winding primary enabling it to be used with a 115 or 230 volt power source. The vacuum fan motor has the same dual winding feature. With the exception of the X and Y servo motor reference phase, all remaining VARIPLOTTER power requirements are supplied by the transformer's secondary. The dual winding primary supplies the servo motors 115 volt reference phase by connecting a motor winding in parallel with a primary winding.

Operational dc voltages are derived from a 55 volt rms, center tapped secondary of T3. The full wave rectified negative voltage is filtered, fused and presented to three basic loads: to the panel illumination through a series dropping resistor, to the pen-lift coil through a series dropping resistor and to dual -30 volt regulators.

The -30 volt supply is of conventional series regulator design. Forward bias for the series element power transistor is provided by a 33 volt (± 3 volts) zener diode. A regulated -15 volts is obtained from each -30 volt supply via a two element voltage divider. A 15 volt zener is used as the series element across which the -15 volt load is placed.

Chopper drive voltage is obtained from the 12 volt rms secondary of T3.

A third T3 secondary provides 115 volts rms for use as primary power for the reference supply transformers T4 and/or T5.

2. REFERENCE SUPPLY

A VARIPLOTTER, depending on the model and, therefore, features, will contain from two to four separate reference supplies. The basic complement provides a pen and arm reference; additional references for time base and pen 2 are supplied as model requirements dictate. Resistance values of divider Ra Rb (Figure 1) vary with application. See the appropriate schematic and parts list for exact values. Each regulator circuit contains a calibration potentiometer to permit accurate adjustment of reference voltage.

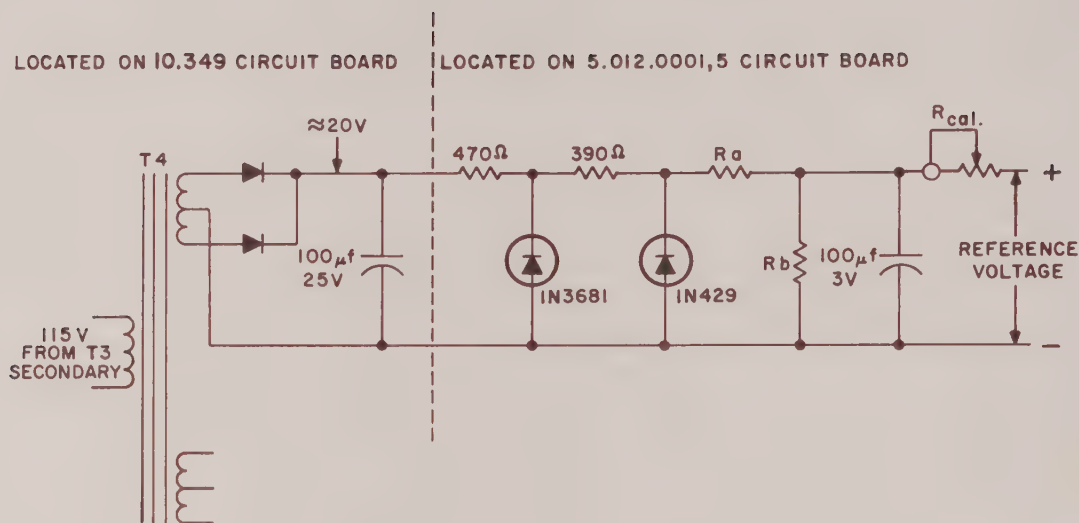


Figure 1. Typical Reference Supply

3. SERVO AMPLIFIER

The servo motors used in the EAI VARIPLOTTER are standard two phase units requiring a reference and control phase input. The control winding is 36 vac and must be ± 90 degrees out of phase with the reference voltage. Reference winding power sources are explained in the power supply section; control winding power is obtained by amplifying the low level error signal (see servo system) with a five stage, high gain, power amplifier. Refer to Figure 2. The amplifier employs three capacitor coupled class A stages in a common emitter configuration. A gain control is provided at the input of the third stage.

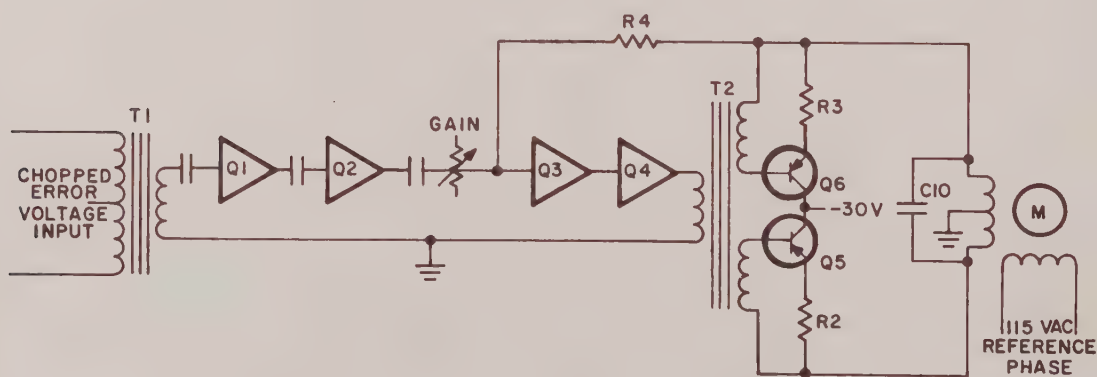


Figure 2. Servo Amplifier, Basic

Amplifier stage Q4, connected in a common collector configuration, serves to match the output impedance of Q3 to the primary of driver transformer T2.

The driving signal to each stage of push-pull power amplifier Q5 and Q6 is applied between the base and emitter; therefore, they operate as common emitter stages.

Chopper action on the dc error signal (see servo system) produces a square wave 50/60 Hz error signal. C10 forms a resonant circuit with the inductance of the control winding. The LC circuit forms a near sine wave for higher motor efficiency.

Resistors R2, R3 and R4 provide amplifier degeneration to increase dynamic linearity and stability.

4. SERVO SYSTEM

4.1 Servo Operation

The circuit of Figure 3 demonstrates the principle of servo system operation. Assume E_{REF} equals ten volts and E_{IN} equals five volts. In order for the voltage across R1 to indicate zero, the linear feedback potentiometer must be positioned at the midpoint of its travel. The reference voltage is now balanced (across R1) with the input. In actual practice, the wiper of the linear feedback potentiometer is positioned by a bi-directional (servo) motor which is controlled (via a power amplifier) by the voltage dropped across R1. Whenever system unbalance generates a voltage drop across R1, the motor will drive to reposition the wiper to a balanced position.

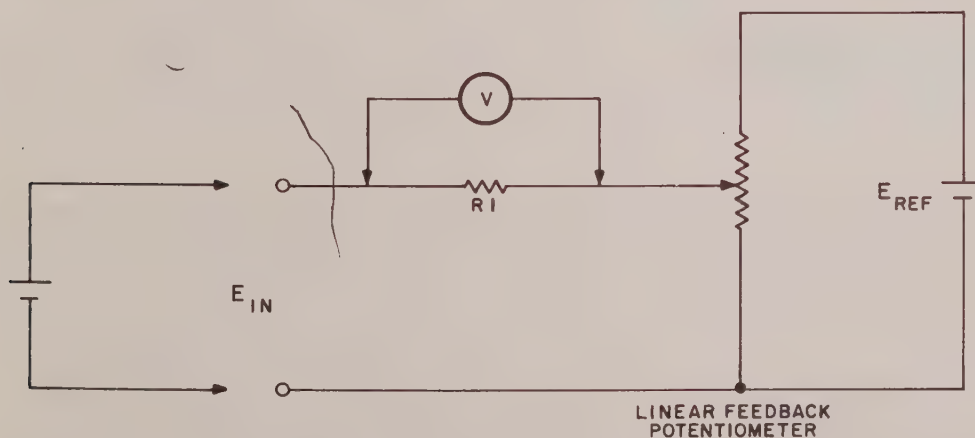


Figure 3. Elementary Servo System

Both the reference and control windings of the servo motors operate on alternating current. The dc error input potential is converted to ac by the action of the chopper and input transformer. The capacitor in series with one leg of the chopper drive voltage causes the chopper contacts, and therefore the chopped error signal, to be displaced the required 90 degrees from the servo motor reference phase.

The ZERO control (Figure 4) permits moving the pen to a convenient reference on the graph without applying an external input voltage. This is accomplished by using the reference voltage at the wiper of the zero pot to unbalance the voltage across R1. As mentioned in a preceding paragraph, whenever system unbalance generates a voltage across R1, the motor will drive to reposition the wiper to a balanced position (in this case the new zero (0, 0) point).

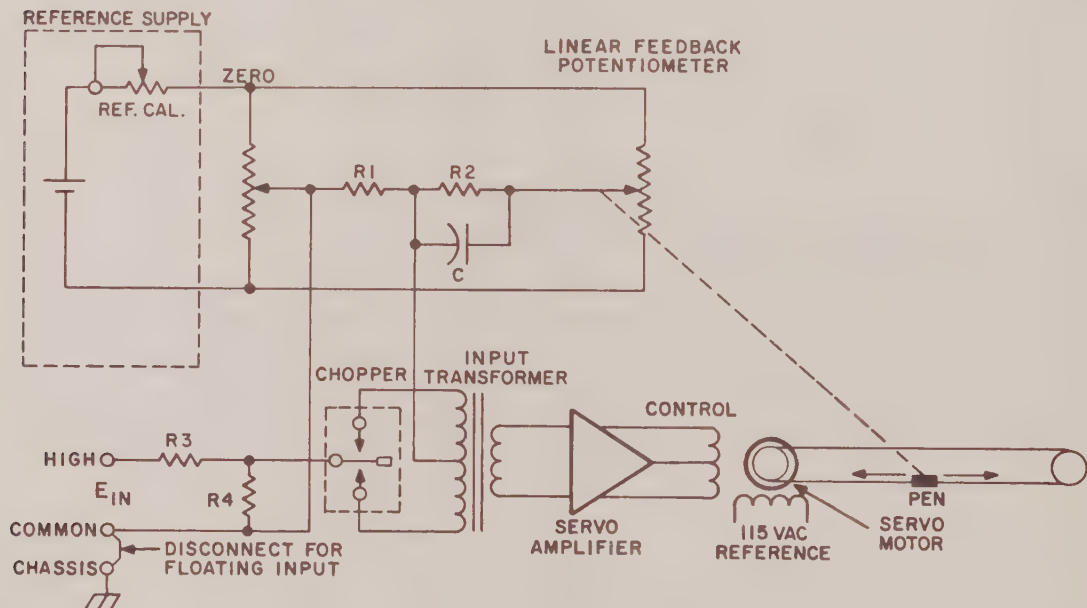


Figure 4. Servo System, Basic

Additional analysis of Figure 4 will reveal the COMMON input terminal as being the point of Common reference in the system. Since all servo system Common connections are made to the wiper of the ZERO control, as the ZERO control is advanced from the negative to a more positive point, the Common point of the servo system also advances to this more positive point.

The ZERO control, then, performs two functions. Rotation of the X and Y ZERO controls allows the operator to select any point within the plotting range as his (0, 0) coordinates; the COMMON input terminal references the input signal to the new (0, 0) coordinates.

Since the reference voltage supply is floating, unbalance will not result when COMMON and CHASSIS terminals are connected.

As mentioned in the basic servo system paragraph, the voltage developed across R1 is applied to the input of the servo amplifier. One side of R1 connects directly to the center tap of the input transformer, and the other side is applied alternately (through R4 and the chopper) to each end of the input transformer.

When a voltage is connected to the input terminals, it is applied to either side of the input transformer by the chopper. Because of this externally applied voltage, the balanced condition (voltage from zero pot and linear feedback potentiometer summing to 0 volt across R1) will be upset. The servo motor will rotate and move the linear feedback potentiometer wiper to the position which nullifies the external voltage.

It was just determined that the voltage being fed back from the linear feedback potentiometer must balance out the externally applied voltage. Assume that the system is being physically displaced from null and, therefore, that one half volt is being developed at the wiper of the linear feedback potentiometer (a typical level for the pen axis); one half volt would be necessary at the plotter input terminals for balance (this would represent the maximum input sensitivity of the system; R2 and R3 must be shorted). If, however, the one half volt at the wiper were divided (as is done by R1 and R2) by one thousand, the input voltage necessary for balance would be one half millivolt. The maximum input sensitivity is developed in this manner.

4.2 Damping

A requirement for damping in an electromechanical device arises from the lag (or lead) of the mechanical device with respect to the electrical input signal. This sluggishness is the result of the mechanical assembly's inertia.

To nullify this difference between input signal and mechanical displacement, a correction signal is generated and combined with the original signal. This resultant (damping) signal is then applied to the servo amplifier input.

The method employed to generate the damping signal is Error Rate Damping; it is accomplished by applying capacitance across R2 of Figure 4. If servo system unbalance occurs, this capacitor charges as current flows through R2. When the system returns to null, current no longer flows through R2 and C will discharge through R2. Notice, though, that before C discharges,

its voltage will tend to unbalance the system and drive the servo. The polarity and amplitude of the voltage from the capacitor will tend to drive the servo in an opposite direction to that of the inertia.

In actual practice, the force is applied before the servo reaches null (due to the reduction in feedback voltage as null is approached); it is this force which is responsible for stopping the servo before inertia causes it to pass through null.

SECTION 8

CALIBRATION

The EAI Series 1132 VARIPLOTTER has been mechanically and electrically calibrated under carefully developed factory procedures; the following calibration procedures are based on factory methods. The VARIPLOTTER should not require adjustment except as a result of long term aging or parts replacement.

1. SCALE FACTOR ACCURACY

This procedure calibrates the internal reference supplies.

NOTE

- 1. In order to take full advantage of the plotters potential accuracy - the calibrating voltage must be accurate to $\pm 0.02\%$, a rule must be used with a ten inch mark accurate to ± 0.002 inch.*
- 2. For volts/centimeter scale factors, use a 20 centimeter deflection.*
- 3. Allow a 30 minute warm-up time before calibration.*

Proceed as follows:

1. Adjust the X (arm) ZERO control to position the pen over the zero inch line. Print a dot to insure an accurate zero reference position.
2. Check addendum to determine the basic X axis (arm) scale factor sensitivity (in volts/inch, or volts/centimeter); multiply the voltage by 10 (X20 for centimeter calibration). This will be the calibrating voltage for the X axis.
3. Apply the voltage to the X axis input. The arm should deflect ten inches (20 centimeters for cm calibration) ± 0.01 inch.
4. If required, adjust the X axis calibration control. See Figure 1.
5. Repeat the above procedure for the Y axis (pen).

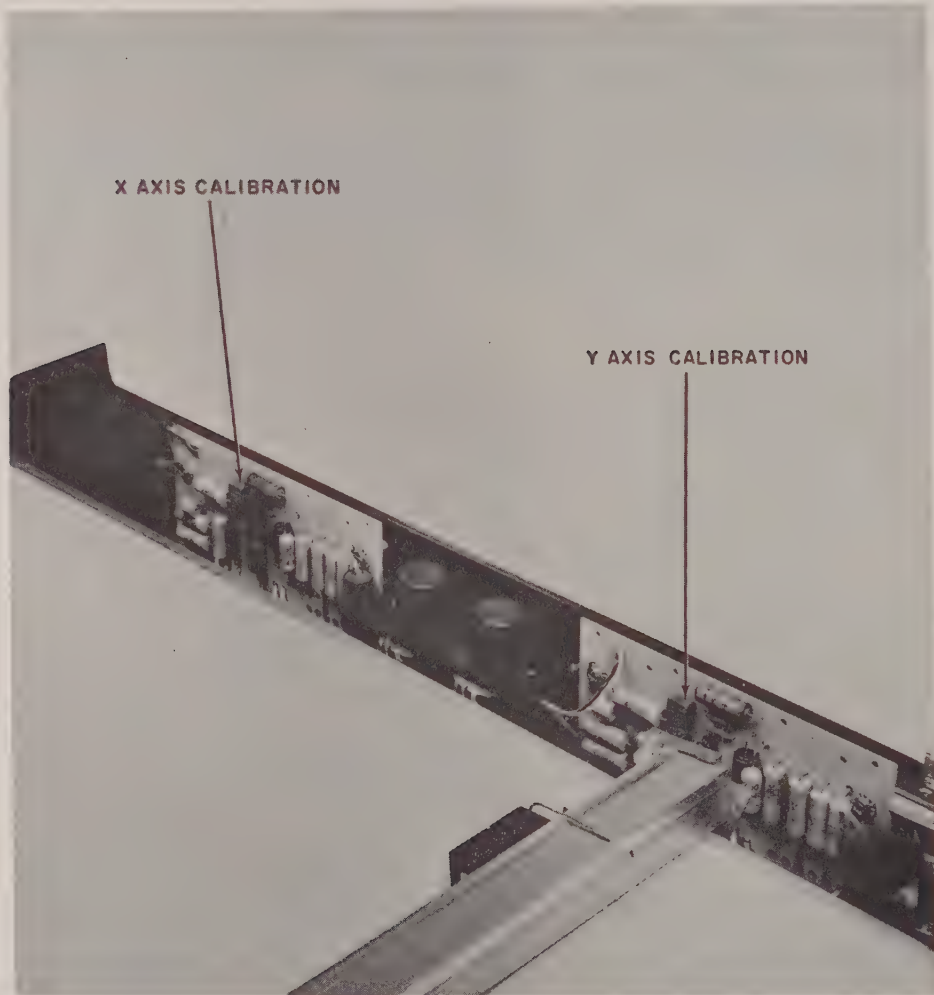


Figure 1. X (Arm) Axis Calibration Control, Typical

2. STATIC ACCURACY

The static accuracy procedure as described in the NORMAL OPERATION section of this manual applies here. See Section 4-3-(2).

SECTION 9

REPLACEABLE PARTS LIST SERIES 1132 VARIPLOTTER

This section provides operation and maintenance personnel with EAI part numbers for major sub-assembly *components*. Part numbers for operator requirements such as chart paper, ink cartridges, etc., are found on Page 3.

EAI maintains a complete stock of the replaceable parts listed on the following pages. However, since many components are industry standards, an "A" or "B" category is assigned to each component as follows:

Category "A" - Standard electronic items, usually available locally.

Category "B" - Proprietary items, order from EAI.

NOTE

*If other than EAI supplied parts are used for
Category "B" items, EAI cannot guarantee oper-
ation within published specifications.*

ORDERING INFORMATION

Specify the EAI Series designation, Model Number and Serial Number, as well as a brief description with the EAI Part Number. EXAMPLE: EAI Series 1132, Model 5.99.0002, S/N 100, EAI Part Number 05 654 0001 0 (Switch, S1).

Your cooperation in supplying the required information will speed the processing of your requests.

ELECTRONIC ASSOCIATES, INC.
INSTRUMENT DIVISION
PARTS SALES DEPT.
LONG BRANCH, N.J., 07740
TEL: 201-229-4400, TWX 510-239-9208

PLEASE NOTE THAT EAI RESERVES THE RIGHT
TO MAKE PART SUBSTITUTIONS WHEN REQUIRED.
IN ALL CASES EAI GUARANTEES THAT THESE
SUBSTITUTIONS ARE ELECTRICALLY AND PHYS-
ICALLY COMPATIBLE WITH THE ORIGINAL COM-
PONENT.

PARTS LIST INDEX

<u>Title</u>	<u>Page</u>
05.099.0002 1132 VARIPLOTTER	9-3
00.010.0349-1 Power Supply Servo Amplifier	9-4
05.012.0001-0 Network, Reference Arm	9-6
05.012.0005-0 Network, Reference Pen	9-7
114.014 Plotting Arm	9-8

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	F2	Fuse, Cartridge, Fast Acting: 2 amps, 125V AGX	00 570 0013 0	A
2		Lamp, Panel Illumination: Hudson 369	00 579 0089 0	A
3		Vacuum Motor 115/230 Volt	00 594 0079 0	B
4		Servo Motor (Located on 00 270 0507 0 Arm Drive Gear Box)	00 594 0068 0	B
5		Arm Mandrel (Linear Feedback Potentiometer)	00 646 0073 0	B
6		Arm Drive Pulley	05 386 0001 0	B
7		Arm Pulley Tension Assembly	00 386 0094 0	B
8		Arm Drive Gear Box*	00 270 0507 0	B
9		Arm Drive Tape	00 278 0281 0	B
10		Pen	00 378 0064 0	B
11		Pen Cleaning Wires: 6 per Bundle	00 406 0123 0	B
12		Ink Cartridge: Red, 12 per Pkg.	00 100 0013 0	B
13		Ink Cartridge: Green, 12 per Pkg.	00 100 0013 1	B
14		Blotter: 4" x 9-1/2", 12 per Pkg.	00 955 0019 0	B
15		Plotting Paper: Chart Type, 1 Inch Spacing 100 Sheets per Pkg.	00 955 0068 0	B
16		Plotting Paper: Chart Type, CM Spacing, 100 Sheets per Pkg.	00 955 0068 1	B
17		Plotting Surface	05 198 0010 0	B
18		Dust Cover	00 198 0701 0	B
19		Fuse, Cartridge, Fast Acting: 2 amps, 250V (F1 on 10.349 Power Supply)	00 570 0087 0	A
20		Contact and Mandrel Cleaner	00 926 0051 0	B
		*The arm drive gear box may be ordered without the servo motor by EAI No. 00 270 0507 0 and by specifying <u>less servo motor.</u>		

*NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS.
A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY.
B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.

UNIT TITLE 1132 VARI PLOTTER
(MAIN FRAME COMPONENTS AND
OPERATING EQUIPMENT)

MODEL NO. 05 099 0002 0,1

Sh. 1 of 1 Sh.

DATE 5 / 24 / 67

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	C1,4,6	Capacitor, Fixed, Electrolytic: 20 uf, 25V	00 516 0183 0	A
2	C2,3,21	Capacitor, Fixed, Ceramic: 150V .01 uf	00 515 0151 0	A
3	C5,7,8	Capacitor, Fixed, Electrolytic: 1000 uf, 3V	00 516 0134 0	A
4	C9	Capacitor, Fixed, Paper: 0.1 uf $\pm 20\%$, 200V	00 520 0211 0	A
5	C10	Capacitor, Fixed, Plastic: 9.36 uf $\pm 10\%$, 200V	00 521 0866 0	B
6	C11	Capacitor, Fixed, Electrolytic: 4000 uf, 40V, +150 -10%	00 516 0345 0	A
7	C12	Capacitor, Fixed, Electrolytic (Non Polarizing) 10 uf $\pm 10\%$, 15V	00 516 0244 0	A
8	C14,15	Capacitor, Fixed, Electrolytic: 2000 uf, 15V	00 516 0346 0	B
9	C17,18	Capacitor, Fixed, Electrolytic: 100 uf, 25V	00 516 0058 0	B
10	C22	Capacitor, Fixed, Electrolytic: 50 uf, 50V +100 -10%	00 516 0193 0	A
11	C25	Capacitor, Fixed, Ceramic: .047 uf $\pm 20\%$, 25V	00 515 0234 0	A
12	C26	Capacitor, Fixed, Ceramic: 1000 pf $\pm 10\%$, 600V	00 515 0050 0	A
13	CR1,2,6	Diode	00 614 0007 0	B
14	CR3,4	Diode	00 614 0252 0	B
15	CR7,8	Diode: Zener; 1N1882	00 614 0254 0	A
16	CR9,10	Diode: Zener	00 614 0319 0	B
17	CR12-15	Rectifier: 1N4003	00 614 0268 0	A
18	D1	Chopper	00 530 0024 0	B
19	F1	Fuse, Cartridge, Fast Acting: 2 amps, 250V 3AG	00 570 0087 0	A

*NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS.

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UNIT TITLE

POWER SUPPLY AND SERVO
AMPLIFIER

MODEL NO.

10.349 1

Sh. 1 of 2 Sh.

DATE 5 / 24 / 67

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	CAT.
20	NW1,2	Circuit Module: Resistor	00 592 0016 0	B
21	Q1,2	Transistor: 2N324 (Selected)	00 686 0096 0	B
22	Q3	Transistor: 2N1192	00 686 0191 0	A
23	Q4	Transistor: 2N1192 (Selected)	00 686 0194 0	B
24	Q5,6,7,8	Transistor: 2N1536	00 686 0085 0	A
25	R1	Resistor, Variable 25K (GAIN ADJ.)	00 642 0205 0	B
26	R2,3	Resistor, Fixed, Wirewound: 2 ohms $\pm 5\%$, 2W	05 636 0001 0	B
27	R4	Resistor, Fixed, Composition: 3.9 Megohms $\pm 10\%$, 1/2W	00 626 0395 1	A
28	R8,9	Resistor, Fixed, Wirewound: 300 ohms $\pm 5\%$, 3W	00 636 0278 0	B
29	R10	Resistor, Fixed, Wirewound: 200 ohms, 3W	00 636	B
30	R11	Resistor, Fixed, Wirewound: 75 ohms $\pm 5\%$, 5W	00 636 0317 0	A
31	R12,13	Resistor, Fixed, Composition: 680 ohms $\pm 10\%$, 2W	00 628 0681 1	A
32	R16	Resistor, Fixed, Composition: 1 Meg $\pm 10\%$, 1/2W	00 626 0105 1	A
33	T1	Transformer, Input	00 684 0218 0	B
34	T2	Transformer, Driver	05 684 0001 0	B
35	T3	Transformer, Power	00 684 0239 0	B
36	T4	Transformer, Power	00 684 0222 0	B
37	XD1	Socket: 9 Contacts	00 650 0165 0	B
38	S2	Switch, Slide (115/230)	00 664 0050 0	A

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UNIT TITLE

POWER SUPPLY AND SERVO
AMPLIFIER

MODEL NO.

10.349 1

Sh. 2 of 2 Sh.

DATE 5 / 24 / 67

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	C1	Capacitor, Fixed, Plastic .022 uf (matched w/Item #1 Model 05 012 0005)	00 525 0012 1	B
2	C2	Capacitor, Fixed, Elec. 100 uf, $\pm 10\%$, 6 WVDC	05 516 0011 0	A
3	C3,C6	Capacitor, Fixed, Tantl. 10 uf, $\pm 20\%$, 10 WVDC	00 516 0373 0	A
4	C4	Capacitor, Fixed, Paper .5 uf $\pm 20\%$, 200V	00 520 0213 0	A
5	C5	Capacitor, Fixed, Plastic, .0047 uf, 400V	05 521 0006 0	B
6	R1,R2	Resistor, Fixed, Film (Refer to addendum for value)	05 634 0222 0	B
7	R3	Resistor, Fixed, Film 24.9K $\pm 1\%$	05 634 0224 0	B
8	R4	Resistor, Fixed, Film 1.24 M $\pm 1\%$	05 634 0223 0	B
9	R5,6	Resistor, Fixed, Film 7.5K, $\pm 1\%$	05 634 0226 0	B
10	R8	Resistor, Var. WW 1K	05 642 0001 1	B
11	R9	Resistor, Fixed Film 560 ohm $\pm 1\%$ 1/8W	00 634 0614 0	B
12	R10	Resistor, Fixed Film 680 ohm $\pm 1\%$ 1/2W	00 634 0615 0	B
13	R11	Resistor, Fixed, Comp: 390 ohm $\pm 10\%$ 1/4W	00 625 0391 0	A
14	R12	Resistor, Fixed, Comp: 470 ohm $\pm 5\%$ 1W	00 627 471 0	A
15	R13	Resistor, Var WW 5K	00 642 0792 0	B
16	CR1	Diode, Silicon 1N3681	00 614 0263 0	A
17	CR2	Diode, Silicon 1N429	00 614 0264 0	A
NOTE: The following changes are made for the 05 012 0001-1 version. Delete Items - 5, 6, 7. Add - Items 18 and 19.				
18	R3	Resistor, Fixed, Film 12.4K $\pm 1\%$ 1W	00 634 0937 0	B
19	R14	Resistor, Var WW 50K	00 642 0792 1	B
*NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS. A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY. B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.			UNIT TITLE	
			NETWORK, REFERENCE ARM	
			MODEL NO. 05 012 0001 0, 1	
DATE 6 / 12 /67			Sh. 1 of 1 Sh.	

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	C1	Capacitor, Fixed, Plastic .022 uf (matched w/Item #1 Model 05 012 0001)	00 525 0012 1	B
2	C2	Capacitor, Fixed, Elec. 100 uf, $\pm 10\%$ 6 WVDC	05 516 0011 0	A
3	C3, C6	Capacitor, Fixed, Tantl. 10 uf, $\pm 20\%$ 10 WVDC	00 516 0373 0	A
4	C4	Capacitor, Fixed, Paper .5 uf, $\pm 20\%$, 200V	00 520 0213 0	A
5	C5	Capacitor, Fixed, Plastic .0047 uf, 400V	05 521 0006 0	B
6	R1,R2	Resistor, Fixed, Film (Refer to addendum for value)	05 634 0222 0	B
7	R3	Resistor, Fixed, Film 24.9K $\pm 1\%$	05 634 0224 0	B
8	R4	Resistor, Fixed, Film 1.24M $\pm 1\%$	05 634 0223 0	B
9	R5,6	Resistor, Fixed, Film 4.87K $\pm 1\%$	05 634 0229 0	B
10	R7	Resistor, Fixed, Film 680 ohm $\pm 1\%$ 1/8W	00 634 0615 0	B
11	R8	Resistor, Vari, WW 1K	05 642 0001 1	B
12	R9	Resistor, Fixed, Film 560 ohm 1/8W	00 634 0614 0	B
13	R10	Resistor, Fixed, Film 1K 1/8W	00 634 0611 0	B
14	R11	Resistor, Fixed, Comp. 390 ohm $\pm 10\%$ 1/4W	00 625 0391 0	A
15	R12	Resistor, Fixed, Comp: 470 ohm $\pm 5\%$ 1W	00 627 0471 0	A
16	R13	Resistor, Var. WW 5K	00 642 0792 0	B
17	CR1	Diode, Silicon, 1N3681	00 614 0263 0	A
18	CR2	Diode, Silicon, 1N429	00 614 0264 0	A
NOTE: The following changes are made for the 05 012 0005-1 version. Delete - Item 5, 6, 7. Add - Item 19 and 20.				
19	R14	Resistor, Var. WW 50K	00 642 0792 1	B
20	R3	Resistor, Fixed, Film 12.4K $\pm 1\%$	00 634 0937 0	B

*NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS.

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UNIT TITLE

NETWORK, REFERENCE PEN

MODEL NO. 05 012 0005 0, 1

Sh. 1 of 1 Sh.

DATE, 6 / 12 / 67

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1		Pen Idler Pulley	00 386 0062 0	B
2		Pen Drive Pulley	00 386 0063 0	B
3		Spring: Solenoid Return	00 434 0179 0	B
4		Arm Brush	00 542 1434 0	B
5		Pen Brush	00 542 1435 0	B
6		Servo Motor	00 594 0068 1	B
7		Solenoid, Push	00 618 0233 0	B
8		Pen Mandrel	00 646 0074 0	B
9		Pen Drive Cable	00 710 0013 0	B

NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS.

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B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.

UNIT TITLE

PLOTTING ARM

MODEL NO.

114,014

Sh. 1 of 1 Sh.

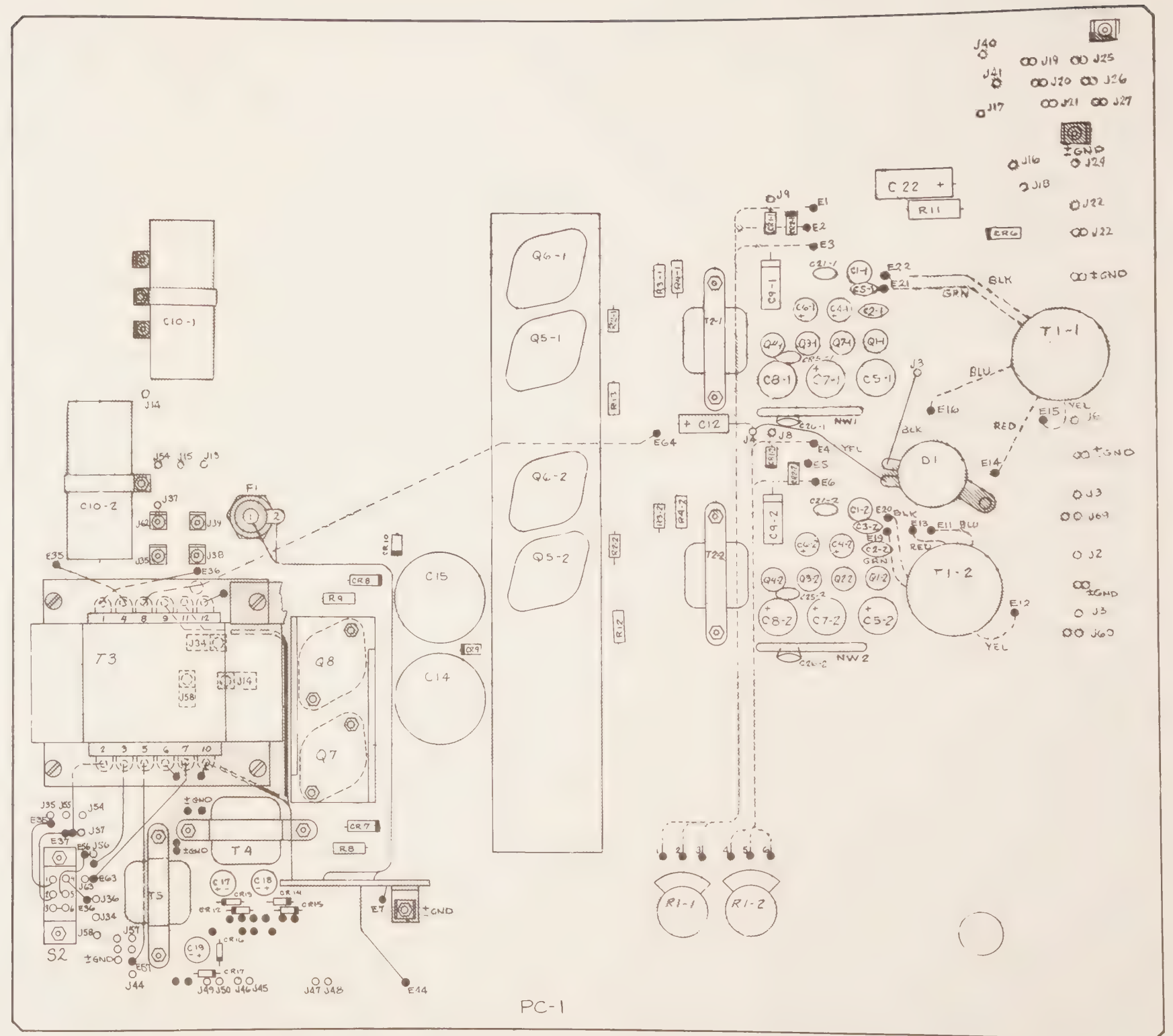
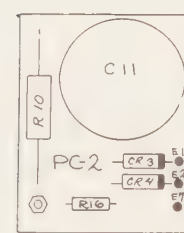
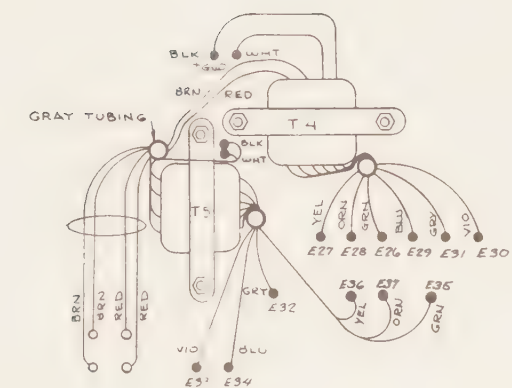
DATE 8 / 24 / 66

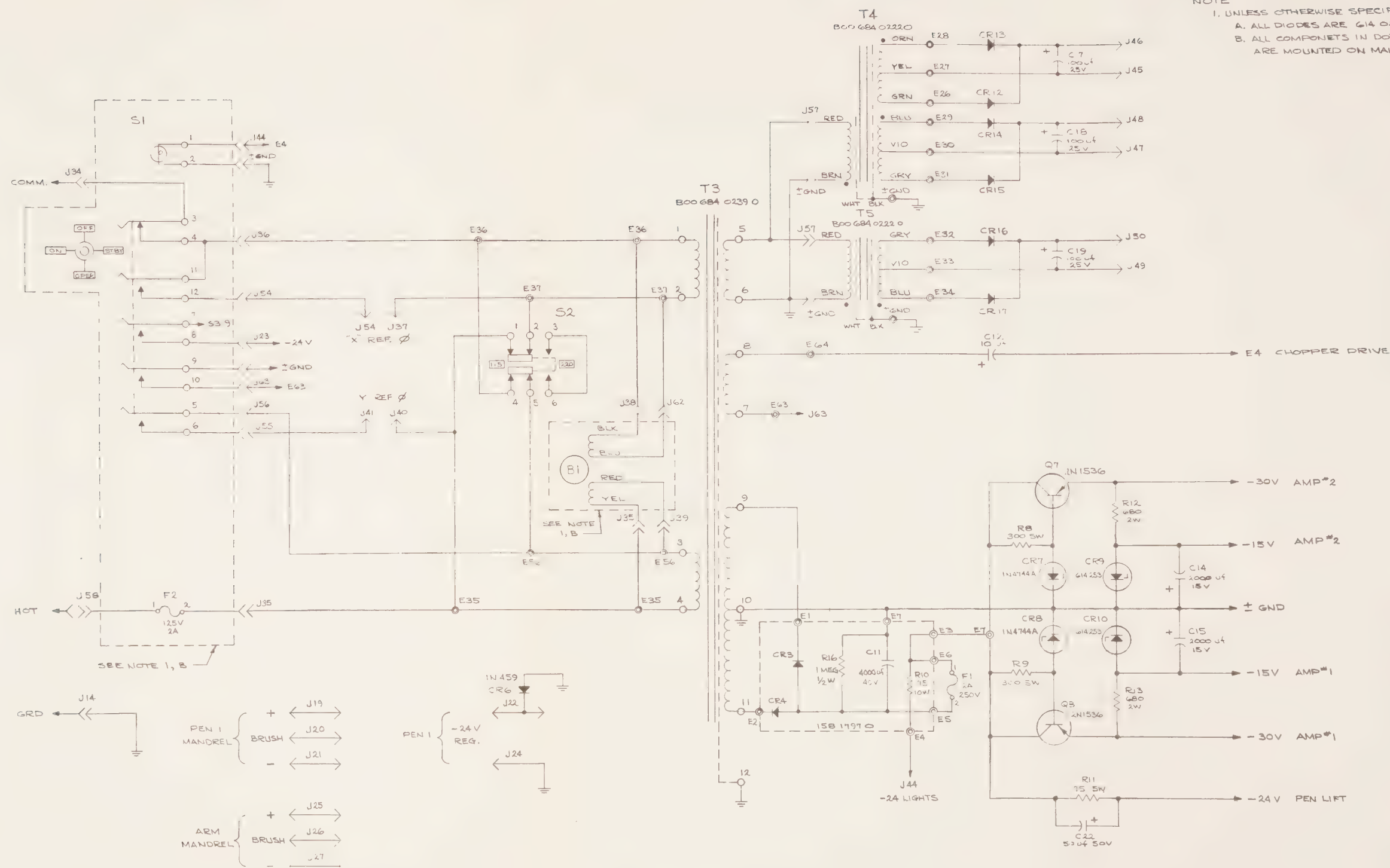
SECTION 10

DRAWINGS SERIES 1132 VARIPLOTTER

This section contains the schematic diagrams, assembly drawings and wiring diagrams required for plotter maintenance. The drawing number appears on the lower right of each page; the pages have been bound in ascending numerical order with the applicable assembly drawing on the facing page.

<u>Unit or Component</u>	<u>Type of Drawing</u>	<u>Drawing Number</u>
Power Supply and Servo Amplifier	Schematic Wiring	D00 010 0349-1 0S (Sheets 1 and 2) C00 010 0349-1 0W
Network Reference (Arm)	Schematic	C05 012 0001 0S
Network Reference (Pen)	Schematic	C05 012 0005 0S
VARIPLOTTER	Schematic Wiring	D05 099 0002 0S D05 099 0002 0W (Sheets 1 and 2)
Y Arm	Wiring	D00 114 0014 0W

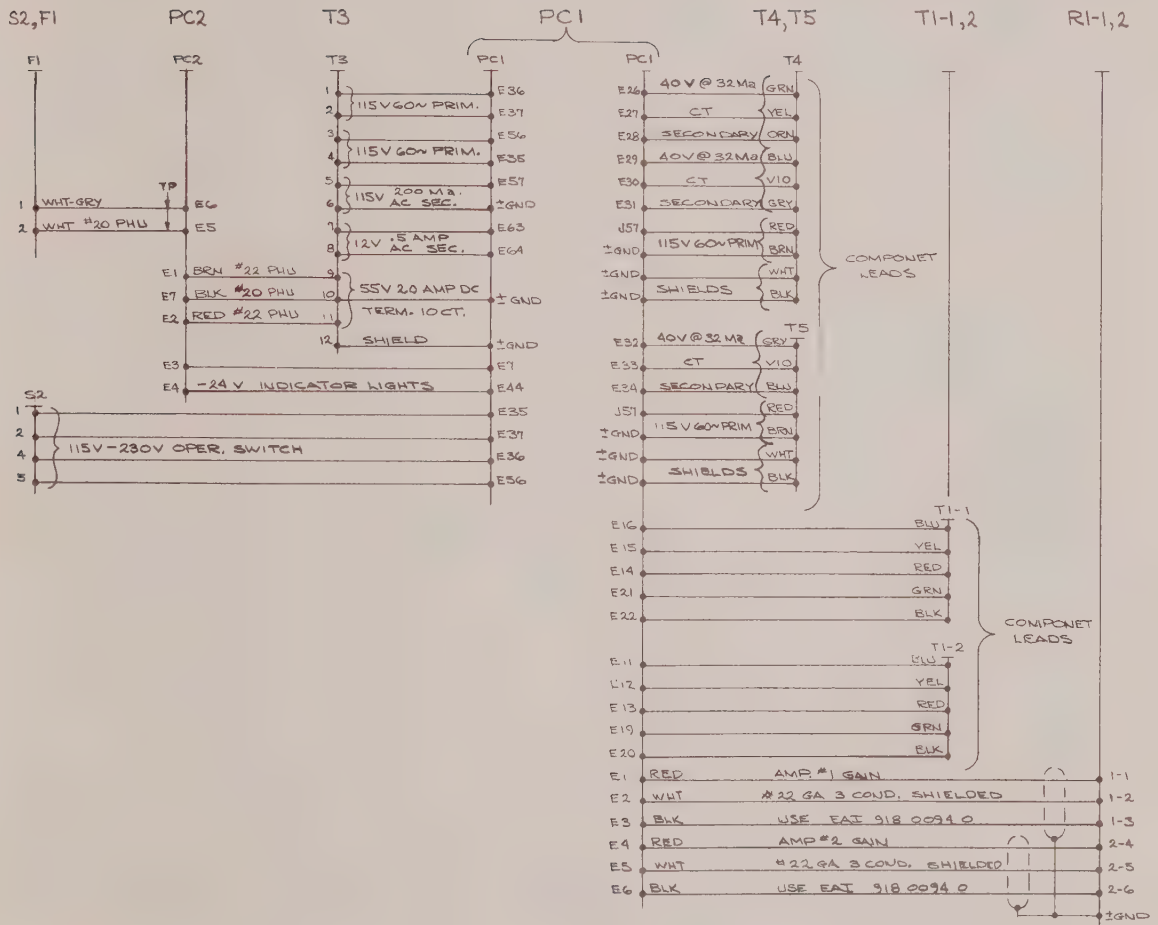




10.0349-1	00 010 0349 13	00 010 0349 1P	AS SHOWN SEE -15, C19, CR17, R10 VALUE IS 200K 1/2W	805 099 0002 0P	58007
10.0349	000 010 0349 05	000 010 0349 0P	AS SHOWN	800 099 0114 0P	58007
UNIT NUMBER	SCHEMATIC NUMBER	PARTS LIST & NEXT ASSY.	DESCRIPTION	PARTS LIST USED ON	PROJECT NUMBER
TABLE OF UNIT NUMBERS					

ELECTRONIC ASSOCIATES, INC. LONG BRANCH, NEW JERSEY	
SCHEMATIC POWER SUPPLY & SERVO AMPL.	
SHT. NO.	
SIZE	
REV. NO.	
PROJECT	58007
PROJECT	000 010 0349 05
SHEET 1 OF 2 SHEETS	

NOTE: 1. UNLESS OTHERWISE SPEC.
2. ALL WIRE IS #20 SO BUS COVERED WITH BLK SLEEVING.



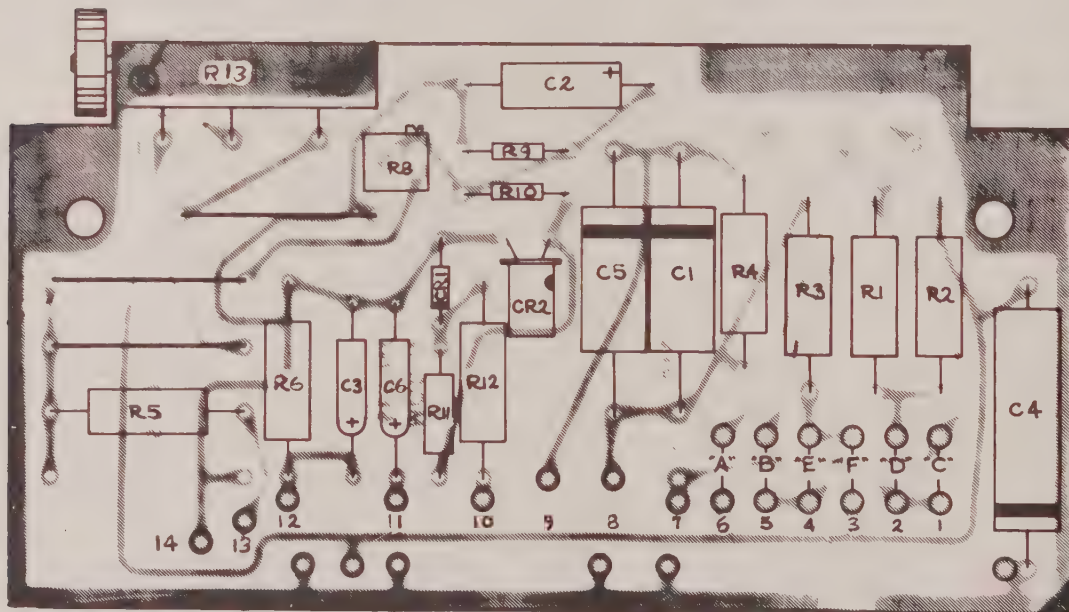
THE 10.349 WAS CREATED TO SATISFY THE REQUIREMENTS OF ECN'S 546, 644, 757, 809, 915, 948, 1007, 1013 & 1027. THE 10.349 SUPERSEDES THE 10.260-0 & 1.

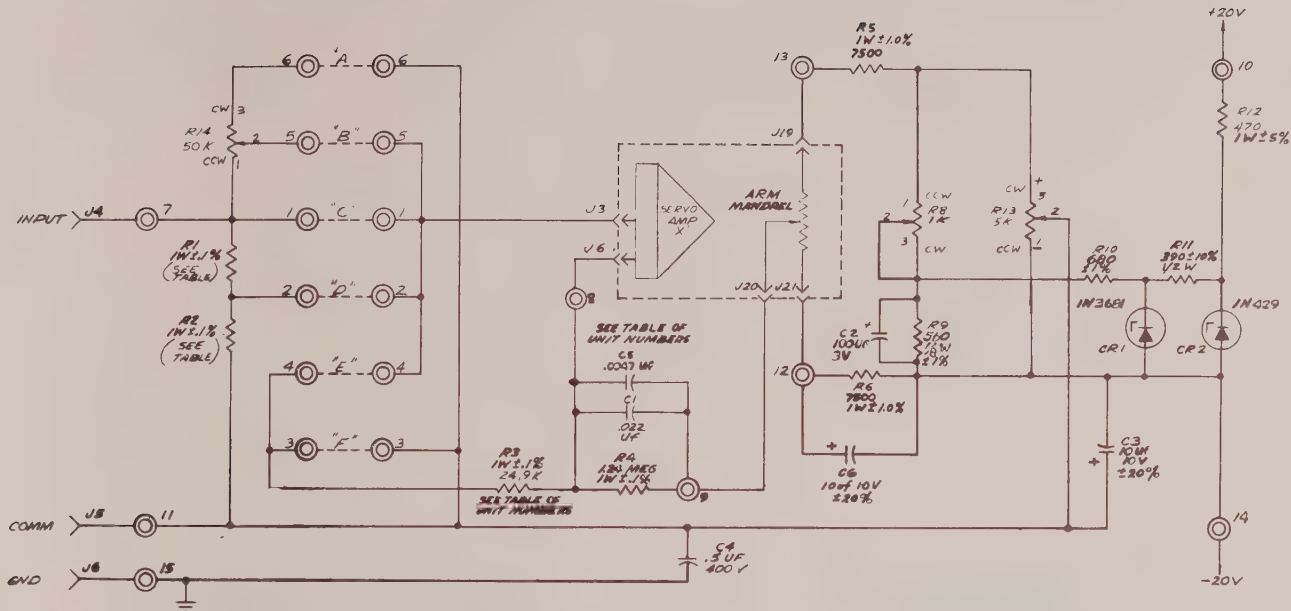
ELECTRONIC ASSOCIATES, INC.	
LONG BRANCH, NEW JERSEY	
WIRING	
PNE. SUP. & SERVO AMP.	
SHT. NO.	
SIZE	
REV. NO.	
PROJECT	C000100349 0W
SHEET	OF SHEETS



DETAIL A

3





SCALE
FACTOR

	A	B	C	D	E	F	R1	R2	C5
1MV/IN			X			X	511K	511K	
2MV/IN				X		X	511K	511K	
50MV/IN			X		X		511K	511K	X
100MV/IN				X	X		511K	511K	X
V.S.F.(MV/IN)	X	X				X			
V.S.F.(30MV/IN)	X	X			X				

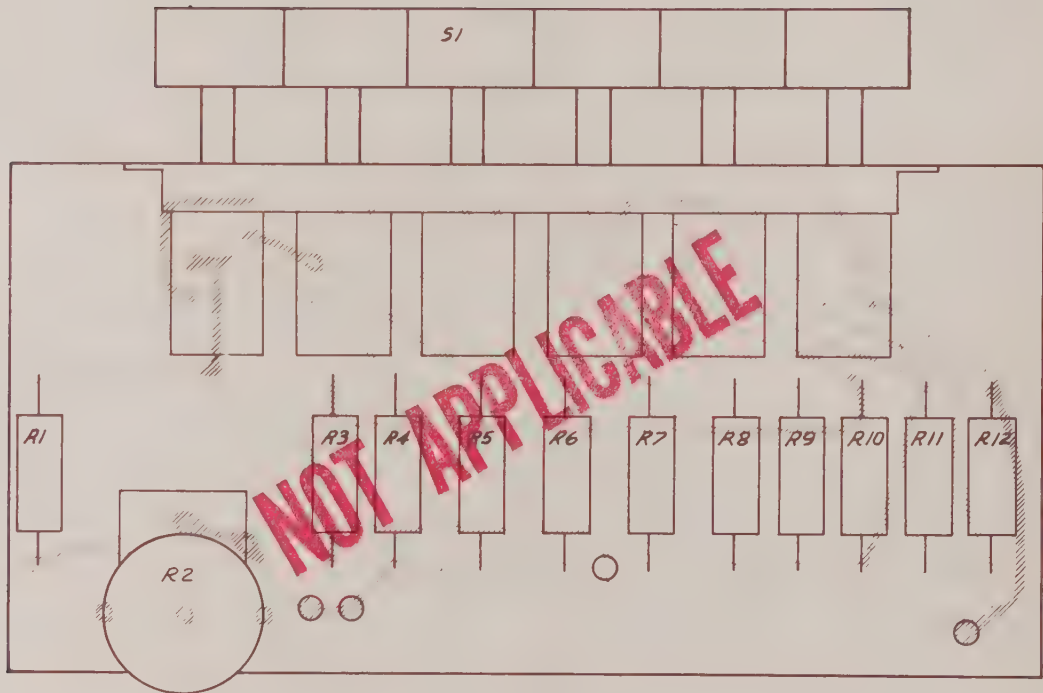
- NOTES: UNLESS OTHERWISE SPECIFIED.
1. ALL RESISTORS ARE 1/2 W.
 2. C1 CAPACITOR IS A MATCHED PAIR WITH C1 ON CORRESPONDING PEN REFERENCE NETWORK, 05, 012, 0005
 3. ON VAR-0 INSTALL JUMPERS PER CUSTOMER SPEC. SHEET #1132- (DWS. NO. AS LISTED IN PROJECT FOLDER, MARKING FILE)

5.12.0001-1	05012000115	0501200011P	AS SHOWN WITH JUMPERS A, B, C, D, E, F, R1, R2, C5; R3 IS 12.5K	A00 020 1156 0P	58015
5.12.0001	05012000105	0501200010P	AS SHOWN, C5 IS 01V AND JUMPERS PER NOTE 3	05019 0002 0P	58015
UNIT NUMBER	SCHEMATIC NUMBER	PARTS LIST & NEXT ASSY.	DESCRIPTION	PARTS LIST USED ON:	PROJECT NUMBER

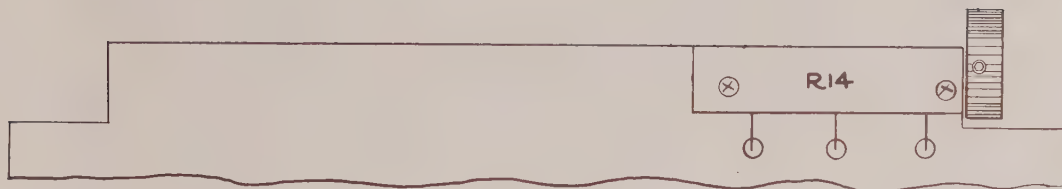
TABLE OF UNIT NUMBERS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITANCE IN PF
RESISTANCE IN OHMS
TOLERANCE: .1% - 0.001 1% - 0.01 5% - 0.05 10% - 0.10
L = 0.10 L = 0.001 L = 0.01

ELECTRONIC ASSOCIATES, INC. LONG BRANCH, NEW JERSEY	
SCHEMATIC NETWORK REFERENCE (ARM)	
SHT. NO.	
REV. NO.	
PROJECT	58015
C05012000105	
SHEET / OF / SHEETS	

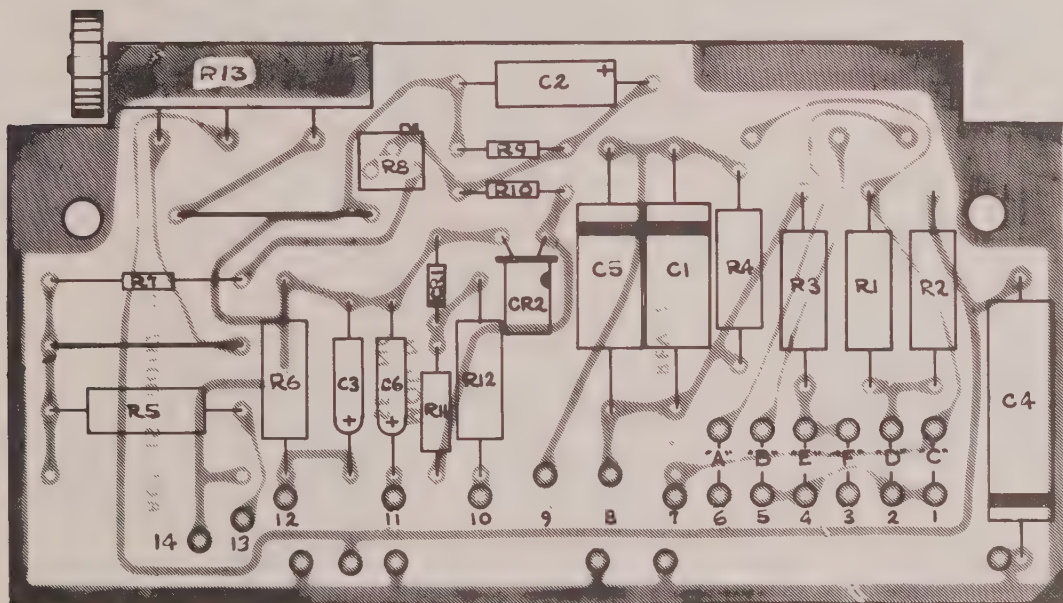


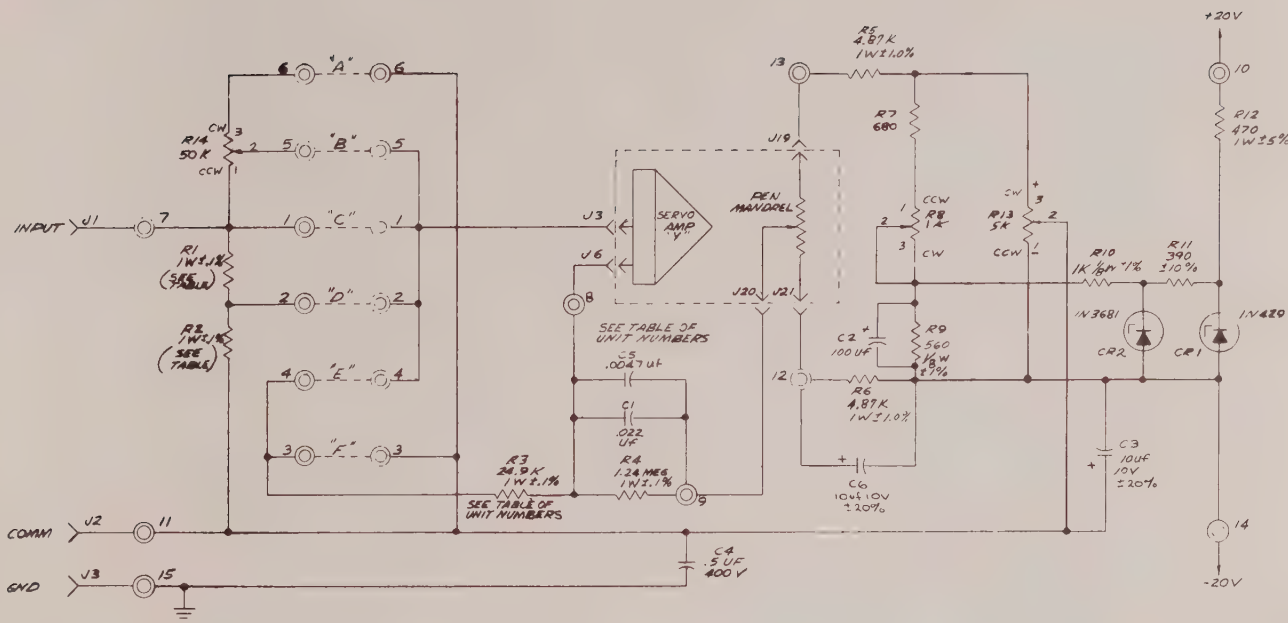
5.012.0002 Network Input Attenuator



DETAIL "A"

3





SCALE
FACTOR

JUMPERS

	A	B	C	D	E	F	R1	R2	C5
1MV/IN			X				X	511K	511K
2MV/IN				X			X	511K	511K
50MV/IN			X		X			511K	511K
100MV/IN				X	X			511K	511K
1V.5.(MV/IN)	X	X					X		
1V.5.(50MV/IN)	X	X			X				

- NOTES: UNLESS OTHERWISE SPECIFIED.
1. ALL RESISTORS ARE 1/2 W.
 2. C1 CAPACITOR IS A MATCHED PAIR WITH C1 ON CORRESPONDING ARM REFERENCE NETWORK, OS. 012.0001
 3. ON 140-0, INSTALL JUMPERS PER CUSTOMER SPEC. SHEET B1132 (DWS. NO. AS LISTED IN PROJECT FOLDER, MARKETING FILE)

5.12.0005-1	OS 012 0005 1S	OS 012 0005 1P	AS SHOWN WITH JUMPERS A,B,C,F; LESS R1,R2,C5, R3 IS 12.5K	A00 020 1156 OP	58015
5.12.0005	OS 012 0005 08	A05 012 0005 0P	AS SHOWN LESS R13,R14 AND JUMPERS PER NOTE 2	B05 099 0002 OP	58015
UNIT NUMBER	SCHEMATIC NUMBER	PARTS LIST & NEXT ASSY.	DESCRIPTION	PARTS LIST USED ON	PROJECT NUMBER

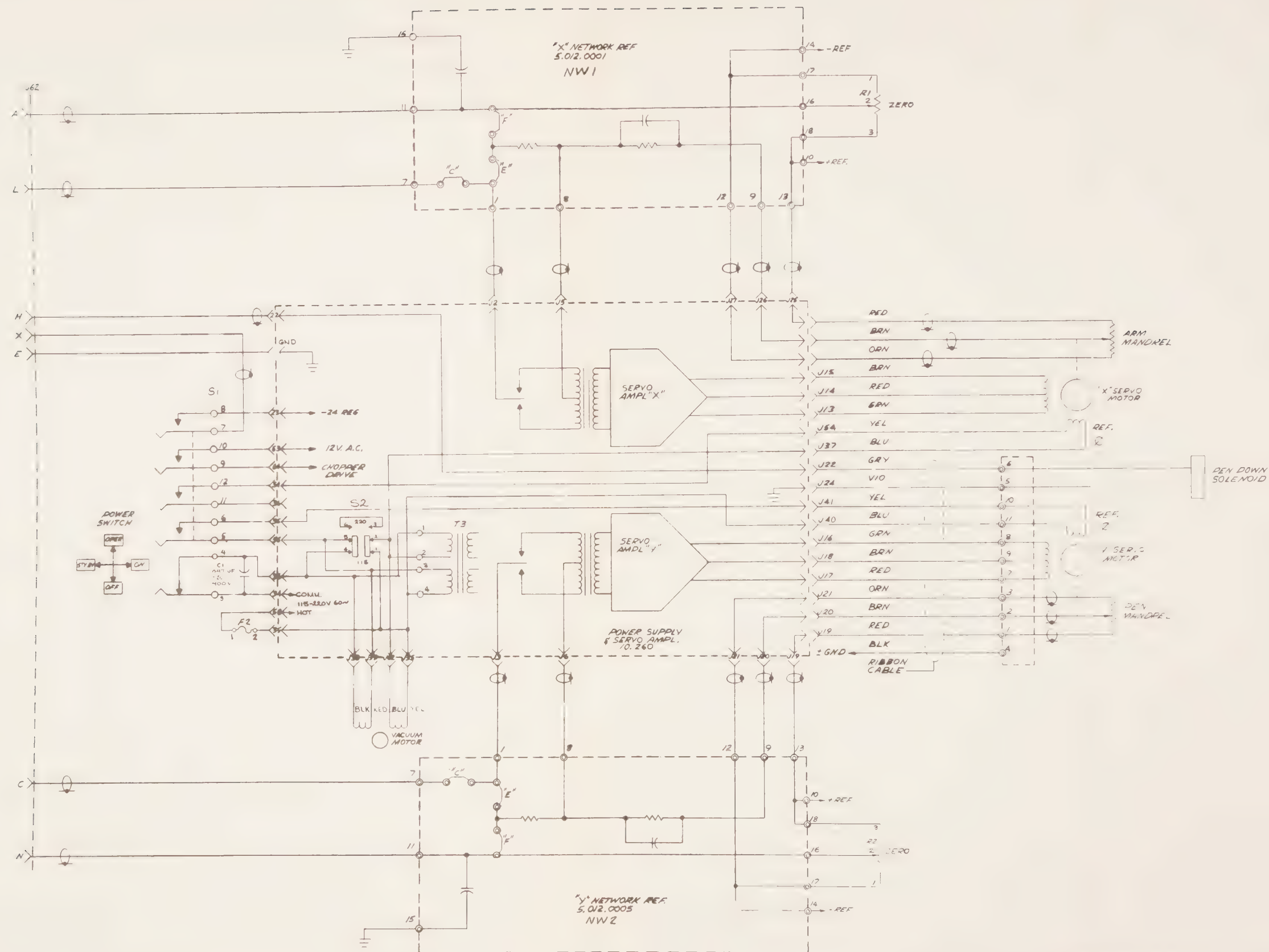
TABLE OF UNIT NUMBERS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITANCE IS IN PF
RESISTANCE IS IN OHMS
TOLERANCE: .01% .1% .5% .1% .5% .1%
ALL .01% .1% .5% .1% .5% .1%
*TOL. OF MATERIAL SUPPLIED

ELECTRONIC ASSOCIATES, INC.
LONG BRANCH, NEW JERSEY

SCHEMATIC
NETWORK REFERENCE
(PEN)

SHT. NO. []
SIZE []
REV. NO. []
PROJECT
58015
C05 012 0005 05
SHEET 7 OF 7 SHEETS

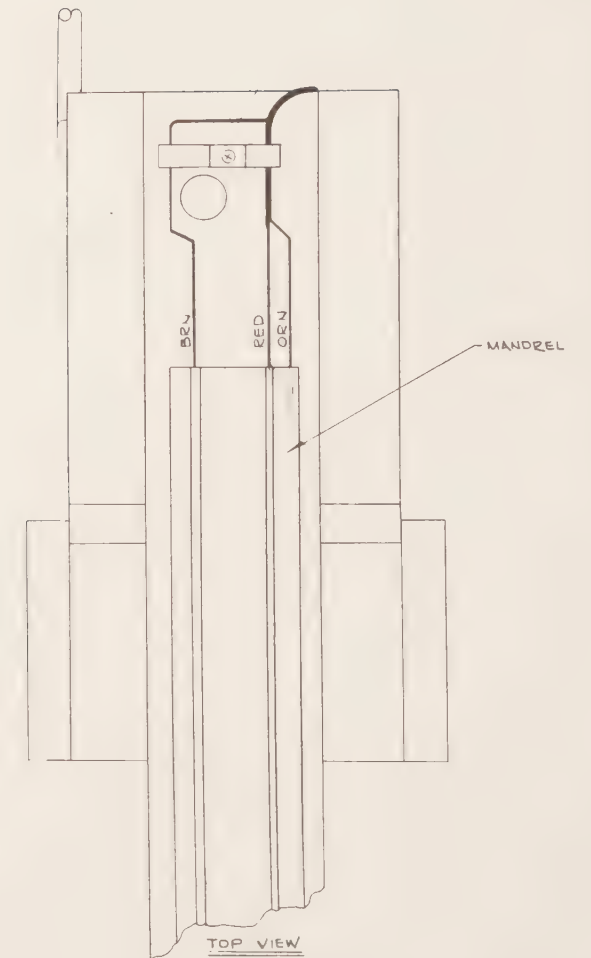


5.99 0002-1	05 099 0002 15	05 099 0002 1P	SEE SHEET 2	805 099 0002 1P	58007
5.99 0002	005 099 0002 05	805 099 0002 0P	AS SHOWN	805 099 0002 0P	58015
UNIT NUMBER	SCHEMATIC NUMBER	PARTS LIST & NEXT ASSY.	DESCRIPTION	PARTS LIST USED ON:	PROJECT NUMBER
TABLE OF UNIT NUMBERS					

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES CAPACITANCE IS IN P.F. RESISTANCE IS IN OHMS TOLERANCE ON FRACTIONS DECIMALS ANGLES		
± 1/100	± .005	±
TYPICAL MATERIAL SUPPLIED		

ELECTRONIC ASSOCIATES, INC. LONG BRANCH, NEW JERSEY	
SCHEMATIC VARI PLOTTER	
SHT. NO. 2	
SIZE D	
REV. NO. 1	
PROJECT 58015	05 099 0002 05
SHEET 1 OF 2 SHEETS	

2



ELECTRONIC ASSOCIATES, INC.												
LONG BRANCH, NEW JERSEY												
WIRING												
Y ARM												
SHT. NO.												
SIZE												
REV. NO.												
PROJECT	D 114 014 OW											
SHEET 1 OF 1 SHEETS												

SECTION 11

ADDENDUM

The following addendum supplements the standard manual by providing the operator with the special customer specifications which have been incorporated.

ADDENDUM

FAIRCHILD - ELECTRO METRICS DIV

The EAI Model 99.723 VARIPLOTTER is a special design developed for Fairchild Electro Metrics Division from the EAI Series 1131 and 1132 VARIPLOTTERS. The special purpose 1132 has been modified to include the two pen X, Y, Y^1 plotting capability of the 1131 without including general use features such as time base and multiple scale factors. The dual pen feature is added by equipping the 1132 with the two pen arm and 10.260-4 amplifier circuit board of the multi-purpose 1131; a remotely located operator's control panel provides control of plot origin (ZERO) and input sensitivity (GAIN) for each axis. Analog input signals and pen lift control connections are applied to TB3 - located on the bottom surface of the VARIPLOTTER.

Engineering drawings and selected pages from the 1131 manual have been included with this addendum to document the changes; Table 1 lists major components of the Model 99.723.

NOTE

Servo GAIN and CALIBRATION controls are accessible from the bottom of the VARIPLOTTER. Each axis' control is identified.

Table 1

<u>COMPONENT</u>	<u>MODEL NO.</u>	<u>QUANTITY</u>
Plotting Arm	114.015	1
Power Supply and Servo Amplifier Circuit Board	10.373 (Modified 10.260-4)	1
X Axis Reference Network	12.1671	1
Y Axis Reference Network	12.1672	2
Arm Drive Gear Box (W/Motor)	270.556	1
Arm Drive Motor	594.091	1

c. Pen Installation

The procedure for installing the pen assembly on the pen-carriage is illustrated in Figure 5. Place the pen assembly pivot shaft against the installation guide ramp. Push the pen assembly straight back toward the arm and downward on top of the pivot spring until the pivot points seat firmly in the carriage bend. The retainer springs tend to deflect to the side; however, when the pen pivot points are firmly seated in the bends, these springs snap back into their proper position on top of the pivot points.

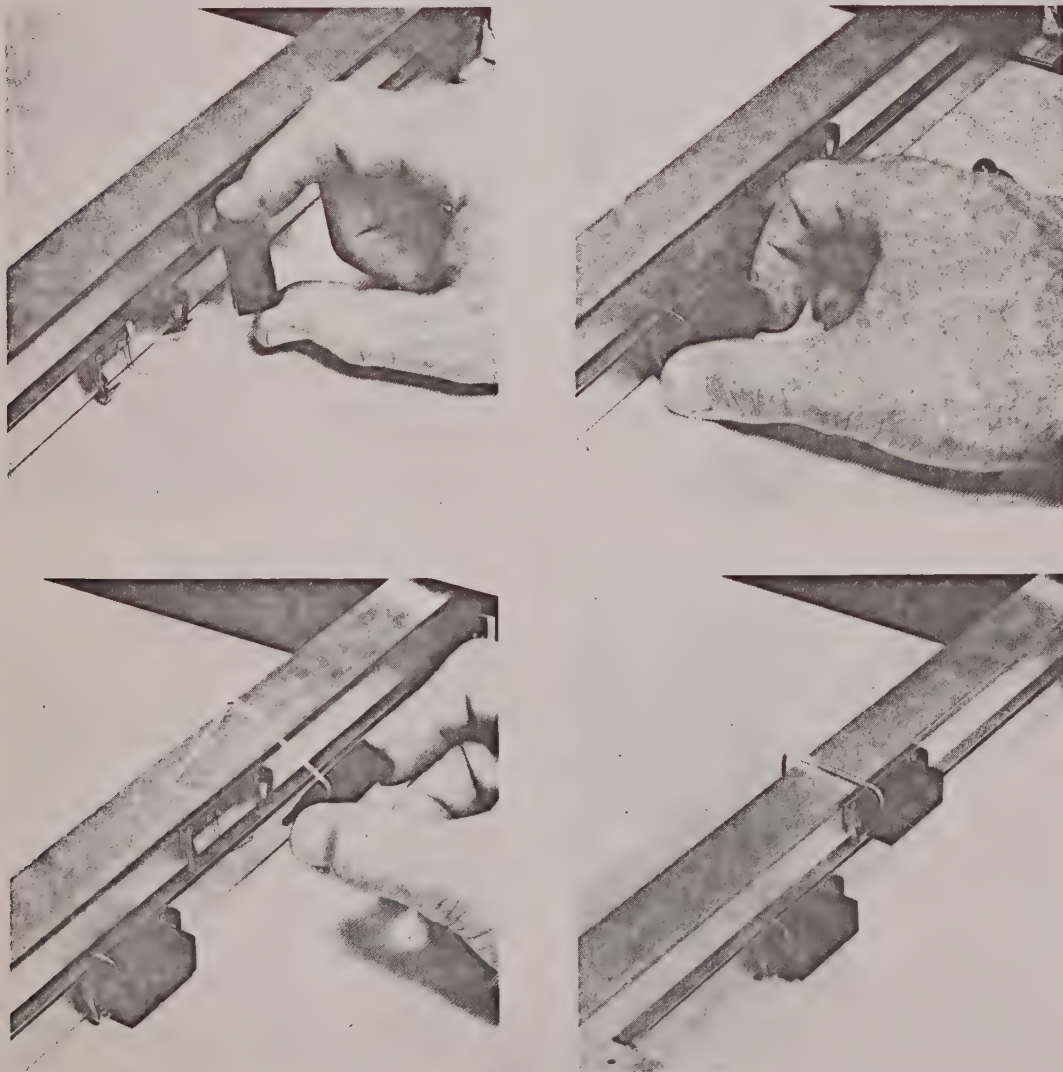
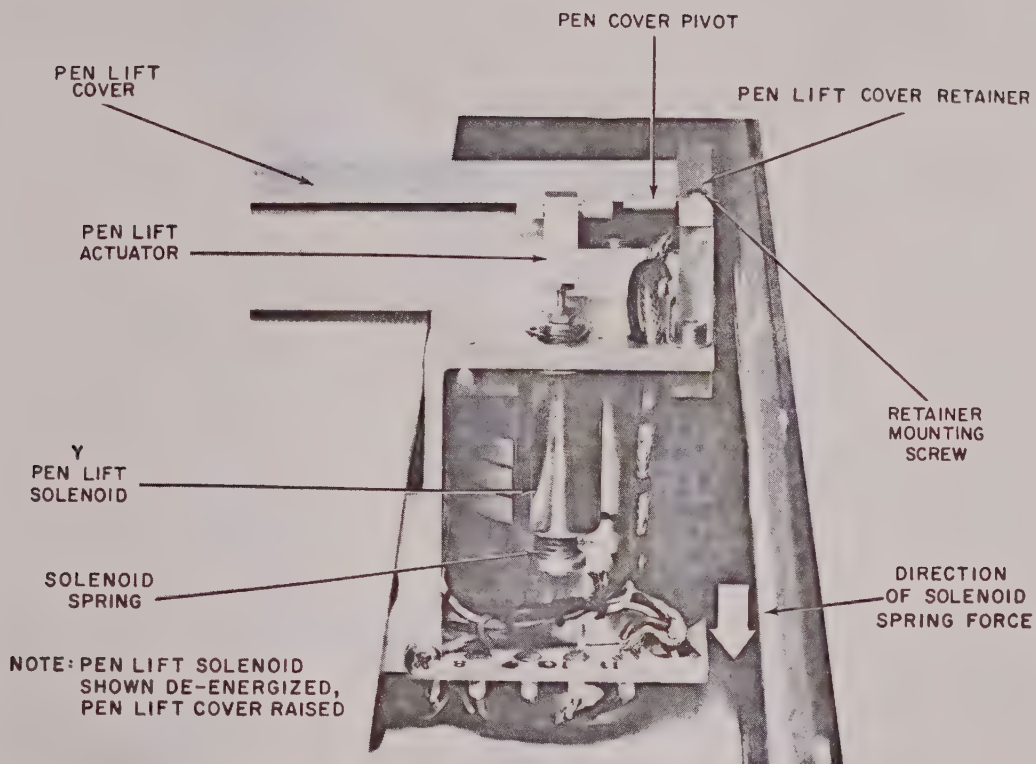
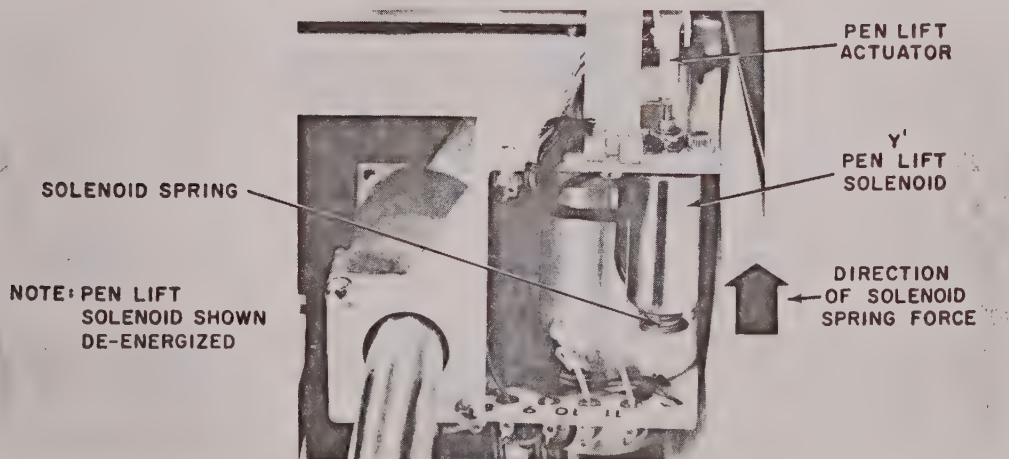


Figure 5. Installation of Pens on Pen Carriage



(a) Y Pen Lift System



(b) Y' Pen Lift System

Figure 11. Pen Lift System Components

Y-Pen Lift Adjustment

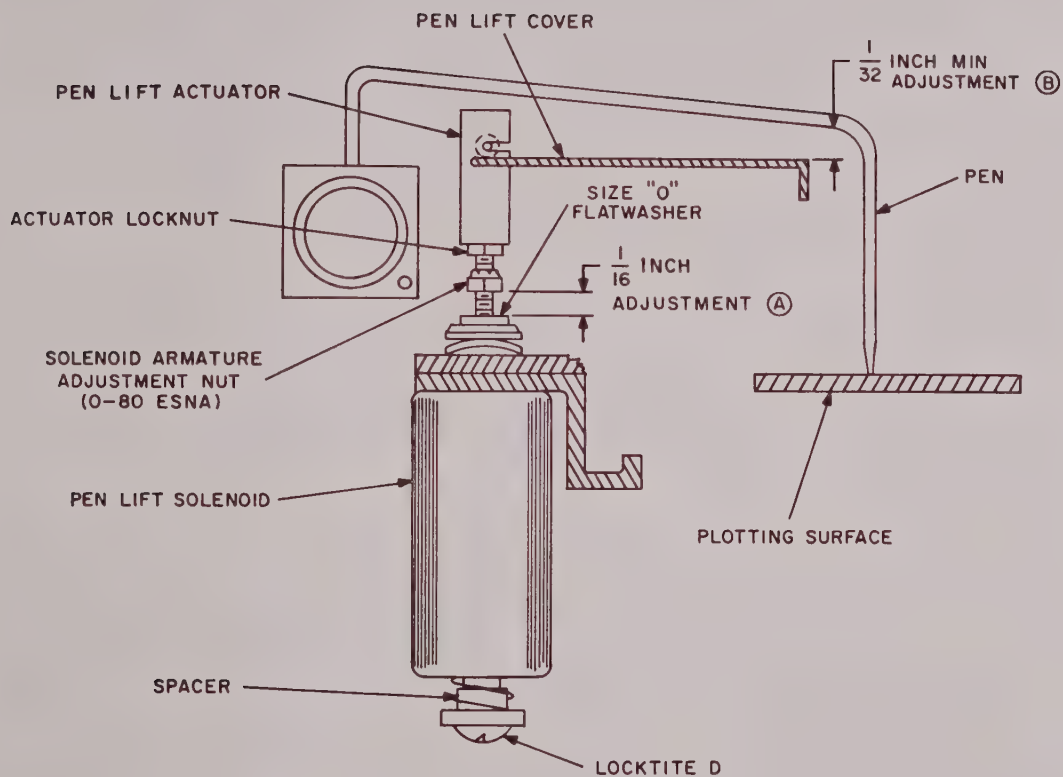
To check the adjustment of the Y-pen-lift system, place the Y-PEN switch at the PLOT position then check adjustments (A) and (B) shown in Figure 20. If these adjustments are correct, place the Y-PEN switch in the UP/OPER position then check adjustment (C). If these adjustments are not as specified, refer to Figures 11 and 20 and proceed as follows:

- (a) Place the Y-PEN switch at the PLOT position (Figure 20a) then, adjust the solenoid armature nut (0-80 ESNA) to achieve the 1/16 inch adjustment dimension (A) for correct armature stroke.
- (b) Loosen the actuator locknut then adjust the pivot actuator so that the pen clears the cover by 1/32 inch minimum (adjustment B). Tighten the actuator locknut.
- (c) Place the Y-PEN switch at the UP/OPER position then adjust the arm cover retainers (see Figure 11) to achieve the 3/64 inch adjustment (C) (see Figure 20b). If this dimension cannot be achieved, see Step (d). It may be necessary to bend the retainers. Bending should be performed with care to avoid destroying the spring action of the retainers.
- (d) Check the Y-pen operation for the full length of pen travel. If the pen becomes deformed so that adjustments (B) or (C) Figure 20 cannot be achieved, bend the pen tube to obtain the correct dimension. After reforming the pen, repeat the above step procedures ensuring that the pen is perpendicular to the plotting surface when in the *plot* position.

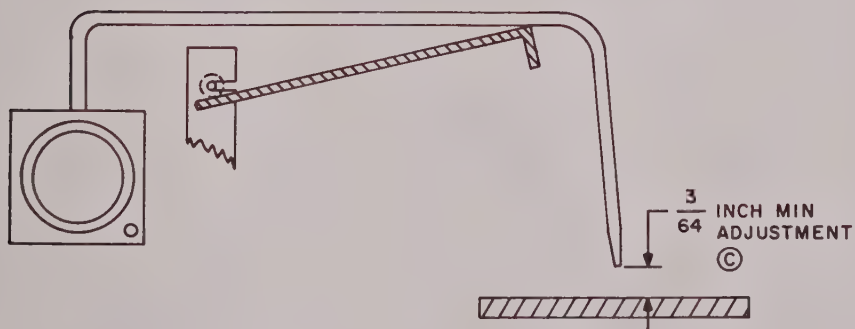
Y' Pen Lift Adjustment

To check the adjustment of the Y'-pen-lift system, place the Y'-PEN switch at the PLOT position then check adjustment (A) shown in Figure 21. If this adjustment is correct place the Y'-PEN switch in the UP/OPER position then check adjustment (B). If these adjustments are not as specified, refer to Figures 11 and 21 and proceed as follows:

- (a) Loosen the solenoid adjustment nut (0-80 ESNA) then adjust the pen-lift actuator so that the pen clears the cover by 1/32 inch minimum (adjustment A). Tighten the adjustment nut.



(a) Pen Plot Position



(b) Pen Up Position

Figure 20. Y Pen Lift Mechanism Adjustment

- (b) Place the Y'-PEN switch at the UP/OPER position then adjust the arm cover retainer (see Figure 11) to achieve the $\frac{3}{64}$ inch adjustment (B) (see Figure 21). If this dimension cannot be achieved, see Step (c). It may be necessary to bend the retainers. Bending should be performed with care to avoid destroying the spring action of the retainers.
- (c) Check the Y'-pen operation for the full length of pen travel. If the pen becomes deformed so that adjustments (A) or (B) Figure 21 cannot be achieved, bend the pen tube to obtain the correct dimension. After reforming the pen, repeat the above step procedures ensuring that the pen is perpendicular to the plotting surface when in the *plot* position.

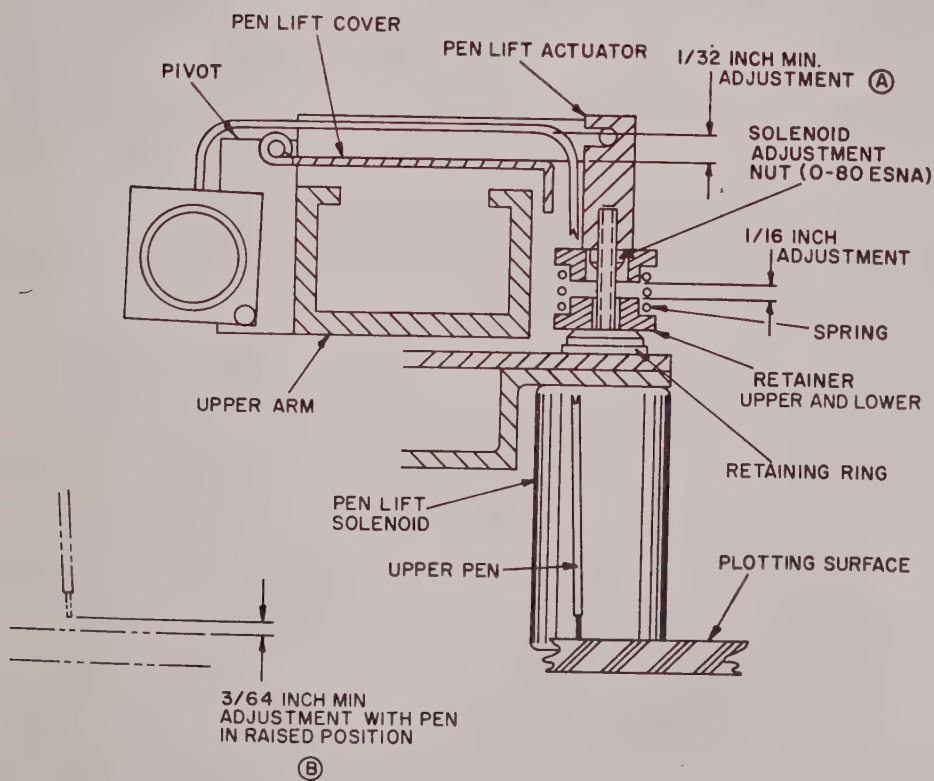


Figure 21. Y' Pen Lift Mechanism Adjustment

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1		Plotting Surface	05 198 0010 0	B
2		Arm Drive Gear Box (W/Motor)	00 270 0556 0	B
3		Arm Drive Motor (W/O Gear Box)	00 594 0091 0	B
4		Arm Drive Tape	00 278 0281 0	B
5		Pen, Lower	00 378 0064 0	B
6		Pen, Upper	00 378 0081 0	B
7		Pen Cleaning Wires (6/Bundle)	00 406 0123 0	B
8		Ink Cartridge, Red, (12/Pkg)	00 100 0013 0	B
9		Ink Cartridge, Green (12/Pkg)	00 100 0013 1	B
10		Blotter, 4" x 9-1/2" (12/Pkg)	00 955 0019 0	B
11		Plotting Paper, Chart Type, 1 Inch Spacing (100 Sheets/Pkg)	00 955 0068 0	B
12		Vacuum Motor	05 594 0001 0	B
13		Arm Mandrel (Linear Feedback Potentiometer)	00 646 0073 0	B
14	F2	Fuse, Cartridge, Fast Acting: 2 amps, 125V AGX	00 570 0013 0	A
15		Fuse, Cartridge, Fast Acting (F1 on 10.260 Circuit Board)	00 570 0087 0	A
16		Contact and Mandrel Cleaner	00 926 0051 0	B
17	R1,3,5	Resistor, Variable, WW 5K, +5%, 2W	00 642 0684 0	B
18	R2,6	Resistor, Variable, WW 50K, +5%, 2W	00 642 0819 0	B
19	R4	Resistor, Variable, WW 100K, +5%, 1/2W	00 642 0795 0	B
20	K1	Relay: 6A Contacts	00 618 0345 0	B

*NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS.

A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY.

B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.

UNIT TITLE **Fairchild**
VARI PLOTTER (Main Frame
Components & Operating Equip)

MODEL NO. 99.723

DATE 12 13 67

Sh. 1 of 1 Sh.

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	C1,4,6	Capacitor, Fixed, Electrolytic: 20 uf, 25V	00 516 0183 0	A
2	C2,3,21	Capacitor, Fixed, Ceramic: 0.01 ufd 150V	00 515 0151 0	A
3	C5,7,8	Capacitor, Fixed, Electrolytic: 1000 uf, 3V	00 516 0134 0	A
4	C9	Capacitor, Fixed, Paper: 0.1 uf <u>+20%</u> , 200V	00 520 0211 0	A
5	C10	Capacitor, Fixed, Plastic: 9.36 uf <u>+10%</u> , 200V	00 521 0866 0	B
6	C11	Capacitor, Fixed, Electrolytic: 4000 ufd, 40V	00 516 0345 0	B
7	C12,13	Capacitor, Fixed, Electrolytic: 10 uf <u>+20%</u> , 15V	00 516 0244 0	A
8	C14,15,16	Capacitor, Fixed, Electrolytic: 2000 uf, 15V	00 516 0346 0	B
9	C17,18,19, 20	Capacitor, Fixed, Electrolytic: 100 uf, 25V	00 516 0058 0	B
10	C22,23	Capacitor, Fixed, Electrolytic: 50 uf, 50V	00 516 0193 0	C
11	C24	Capacitor, Fixed, Elect. 1 uf <u>+20%</u> , 35V	00 516 0210 0	B
12	C25	Capacitor, Fixed, Ceramic: .047 ufd	00 515 0234 0	B
13	C26	Capacitor, Fixed, Ceramic: 1000 pf	00 515 0050 0	B
14	C27	Capacitor, Fixed, Electrolytic: 10 ufd, <u>+10%</u> , 10V	00 516 0373 0	A
15	CR1,2,5,6	Diode, Silicon: 1N459	00 614 0007 0	A
16	CR3,4	Diode, Silicon	00 614 0252 0	B
17	CR7,8	Diode, Zener; 1N1882	00 614 0254 0	A
18	CR9,10,11	Diode, Zener	00 614 0319 0	B

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A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY.
B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.

UNIT TITLE

POWER SUPPLY AND SERVO
AMPLIFIER

MODEL NO. 10.373-0

DATE 12 14 / 67

Sh. 1 of 2 Sh.

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
19	CR12-19	Rectifier: 1N4003	00 614 0268 0	A
20	D1,2	Chopper: 6.3V, 50/60 Hz	00 530 0024 0	B
21	F1	Fuse, Cartridge, Fast Acting: 2 amps, 250V	00 570 0087 0	A
22	NW1,2,3	Circuit Module	00 592 0135 0	B
23	Q1,2	Transistor	00 686 0402 0	B
24	Q3	Transistor: 2N1192	00 686 0191 0	A
25	Q4	Transistor	00 686 0194 0	B
26	Q5-8	Transistor: 2N1536	00 686 0085 0	A
27	R1	Resistor, Variable, Wirewound: 25K	00 642 0205 0	A
28	R2,3	Resistor, Fixed, Wirewound: 2 ohms <u>+5%</u> , 2W	05 636 0001 0	B
29	R4	Resistor, Fixed, Composition: 3.9 Megohms <u>+10%</u> , 1/2W	00 626 0395 1	A
30	R8,9	Resistor, Fixed, Wirewound: 300 Ohms <u>+5%</u> , 3W	00 636 0278 0	B
31	R10	Resistor, Fixed, Wirewound: 500 ohms <u>+5%</u> , 5W	00 636 0061 0	B
32	R11,14	Resistor, Fixed, Wirewound: 75 ohms <u>+5%</u> , 5W	00 636 0317 0	A
33	R12,13,15	Resistor, Fixed, Composition: 680 ohms <u>+10%</u> , 2W	00 628 0681 1	A
34	R16	Resistor, Fixed, Composition: 1 Meg, <u>+5%</u> , 1/2W	00 626 0105 0	A
35	T1	Transformer, Audio Input	00 684 0218 0	B
36	T2	Transformer, Driver	05 684 0001 0	B
37	T3	Transformer, Power: Step-Down	00 684 0239 0	B
38	T4,5	Transformer, Power	00 684 0222 0	B
39	TMTR	Thermistor	00 646 0031 0	B

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A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY.
B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.

UNIT TITLE

POWER SUPPLY AND SERVO
AMPLIFIER

MODEL NO. 10.373-0

DATE 12 14 '67

Sh. 2 of 2 Sh.

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	C1	Capacitor, Fixed, Plastic .022 uf (Matched w/Item #1 Model 00 012 1672)	00 525 0013 0	B
2	C2	Capacitor, Fixed, Elec. 100 uf, <u>+10%</u> , 6 WVDC	05 516 0011 0	A
3	C3,6	Capacitor, Fixed, Tantl. 10 uf, <u>+20%</u> , 10 WVDC	00 516 0373 0	A
4	C4	Capacitor, Fixed, Paper .5 uf <u>+20%</u> , 200V	00 520 0213 0	A
5	C5	Capacitor, Fixed, Plastic, .0047 uf, 400V	05 521 0006 0	B
6	R1	Resistor, Fixed, Film: 511K <u>+1%</u>	05 634 0222 0	B
7	R2	Resistor, Fixed, WW: 16.666K <u>+1%</u>	00 638 1209 0	B
8	R3	Resistor, Fixed, Film 24.9K <u>+0.1%</u>	05 634 0224 0	B
9	R4	Resistor, Fixed, Film 1.24 M <u>+0.1%</u>	05 634 0223 0	B
10	R5,6	Resistor, Fixed, Film 7.5K, <u>+1%</u>	05 634 0226 0	B
11	R8	Resistor, Var. WW 1K	00 642 0658 0	B
12	R9	Resistor, Fixed Film 560 ohm <u>+1%</u> 1/8W	00 634 0614 0	B
13	R10	Resistor, Fixed Film 680 ohm <u>+1%</u> 1/2W	00 634 0615 0	B
14	R11	Resistor, Fixed, Comp: 390 ohm <u>+10%</u> 1/4W	00 625 0391 0	A
15	R12	Resistor, Fixed, Comp: 470 ohm <u>+5%</u> 1W	00 627 0471 0	A
16	CR1	Diode, Silicon 1N3681	00 614 0263 0	A
17	CR2	Diode, Zener	00 614 0453 0	B
*NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS. A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY. B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.			UNIT TITLE	
			NETWORK, REFERENCE ARM	
			MODEL NO. 00 012 1671 0	
			Sh.1 of 1Sh.	
DATE 12 / 13 / 67				

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	C1	Capacitor, Fixed, Plastic .022 uf (Matched w/Item #1 Model 00 012 1671)	00 525 0013 0	B
2	C2	Capacitor, Fixed, Elec. 100 uf, $\pm 10\%$ 6 WVDC	05 516 0011 0	A
3	C3,6	Capacitor, Fixed, Tantl. 10 uf, $\pm 20\%$ 10 WVDC	00 516 0373 0	A
4	C4	Capacitor, Fixed, Paper .5 uf, $\pm 20\%$, 200V	00 520 0213 0	A
5	C5	Capacitor, Fixed, Plastic .0047 uf, 400V	05 521 0006 0	B
6	R1	Resistor, Fixed, WW 30K, $\pm 0.1\%$	00 638 0958 0	B
7	R2	Resistor, Fixed, WW: 10K, $\pm 0.1\%$	00 638 0792 0	B
8	R3	Resistor, Fixed, Film 24.9K $\pm 0.1\%$	05 634 0224 0	B
9	R4	Resistor, Fixed, Film 1.24M $\pm 0.1\%$	05 634 0223 0	B
10	R5,6	Resistor, Fixed, Film 4.87K $\pm 1\%$	05 634 0229 0	B
11	R7	Resistor, Fixed, Film 680 ohm $\pm 1\%$ 1/8W	00 634 0615 0	B
12	R8	Resistor, Vari, WW 1K	00 642 0658 0	B
13	R9	Resistor, Fixed, Film 560 ohm 1/8W	00 634 0614 0	B
14	R10	Resistor, Fixed, Film 1K 1/8W	00 634 0611 0	B
15	R11	Resistor, Fixed, Comp. 390 ohm $\pm 10\%$ 1/4W	00 625 0391 0	A
16	R12	Resistor, Fixed, Comp: 470 ohm $\pm 5\%$ 1W	00 627 0471 0	A
17	R13	Resistor, Var. WW 5K	00 642 0792 0	B
18	CR1	Diode, Silicon, 1N3681	00 614 0263 0	A
19	CR2	Diode, Zener	00 614 0453 0	B

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UNIT TITLE

NETWORK, REFERENCE PEN

MODEL NO. 00 012 1672 0

DATE 12 / 13 / 67

Sh. 1 of 1 Sh.

THE

PEN 1000

Y. COMMI

CONTROL FUND

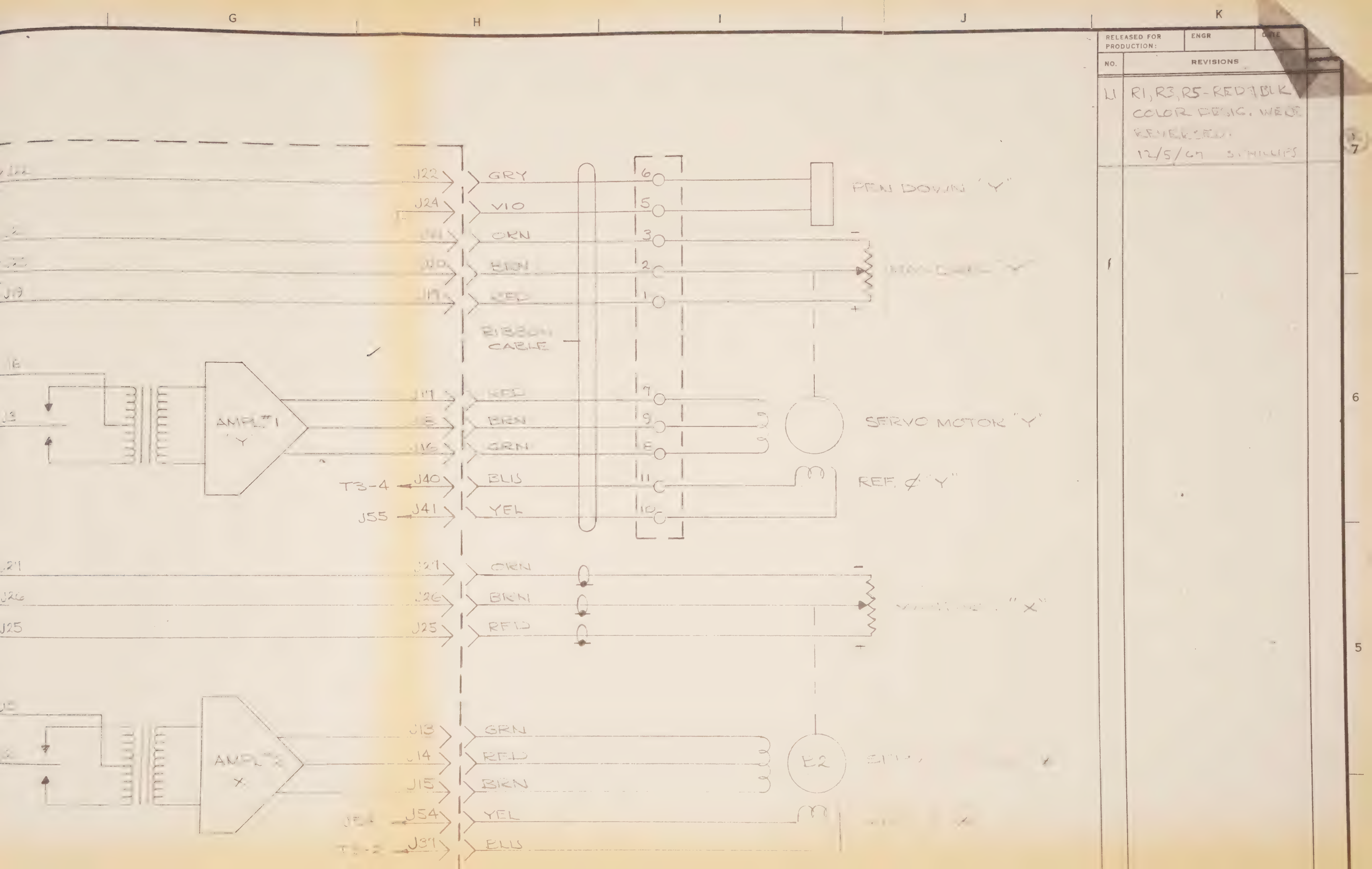
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25-11-1944

GNP

5-1-12

1991 (✓)



RELEASED FOR PRODUCTION:		ENGR	DATE
NO.	REVISIONS		
11	R1, R3, R5 - RED & BLK COLOR DESIG. WERE REVERSED.		
	12/5/67 S. HILLIPS		

Y1 COMMS

Y1 INPUT

3 DND

PTEN 2 COIL

PTEN 2 COIL V.

PTEN 1 COIL V.

GAIN
00 312 0536 CW

FILTER

NW3 ("Y1")
00 312 1612

K1

DRY

WET

BLK

WHT

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WHT

WHT

WHT

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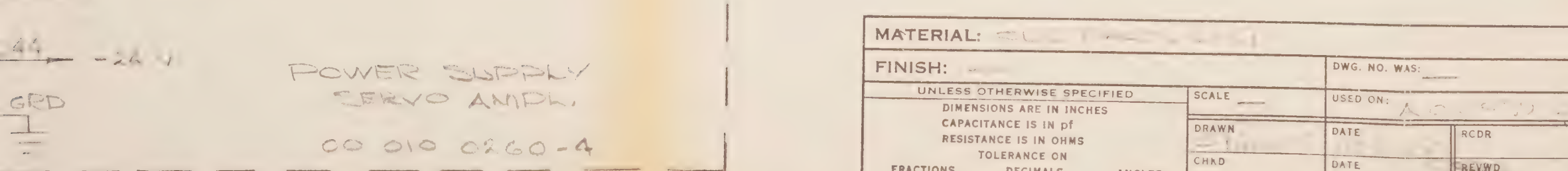
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TB1

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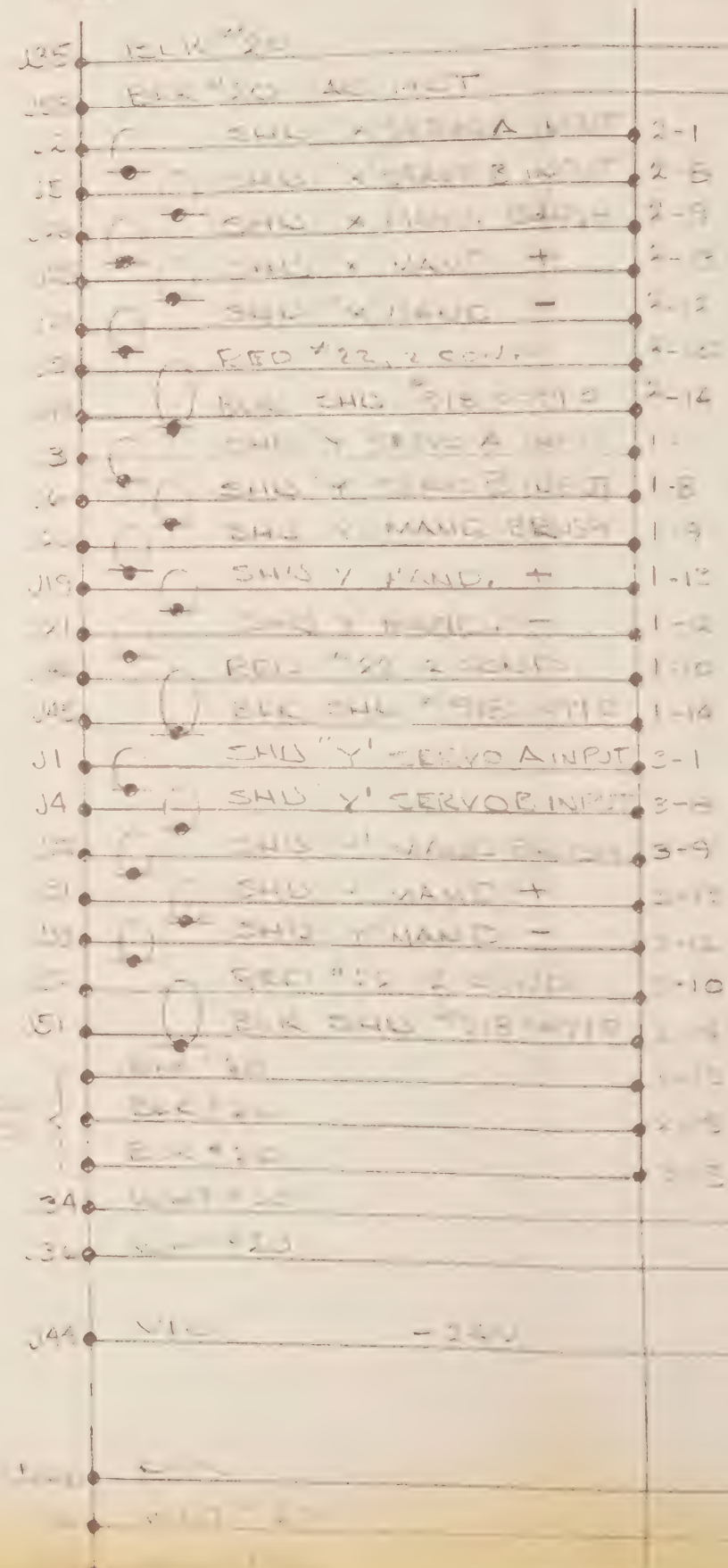
P2

P2

NW1,213

COOLING UNIT

WINDING



NOTES

UNLESS OTHERWISE SPECIFIED

1. ALL WIRES TO BE #24 GA. 17H 2.
2. ALL SHV WIRE PER FAI #91801300
3. ALL WIRES TERMINATED ON PS SHALL BE TERMINATED WITH TABS 614 1950.
4. ALL SHIELDS TO BE TERMINATED WITH TABS NEAREST GND. ON PS CARD EXCEPT AS NOTED.
5. THE FOLLOWING SHIELD LEADS TERMINATED ON PS ARE TERM. TOGETHER WITH LOG 614 2120 TO NEAREST GND LUG, 19, 20, 21 & 25, 26, 27.

RELEASED FOR PRODUCTION	ENGR	DATE
NO.	REVISIONS	APP'D
1	R1, R3, R6 TERM 113 WERE REVERSED. 12/5/67 S. PHILLIPS	
2	IN COMPONENT WIRING INFORMATION, WIRING FOR DS-52-2 TO LI-1 & FROM LI-2 TO SI-2 WAS NOT SPEC. 12/5/67 S. PHILLIPS	

XF2
S1 & S2
R1-R6

XK1

TE3

XF2-2

XF2-1

S1-1

S1-2

S2-1

S2-2 VINS - 24V

NEAR COPU

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1-99		
1-100		

A

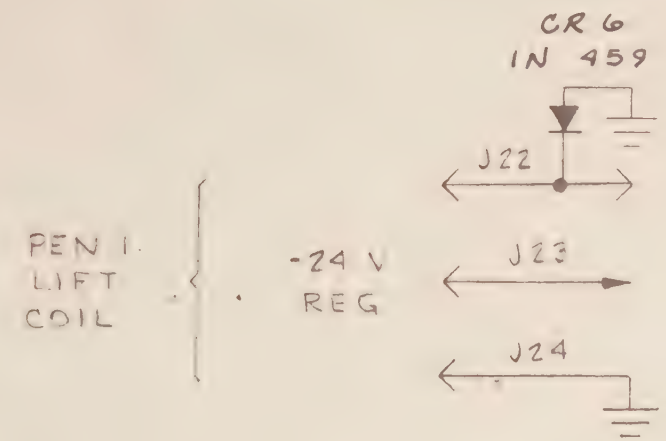
B

C

D

E

7



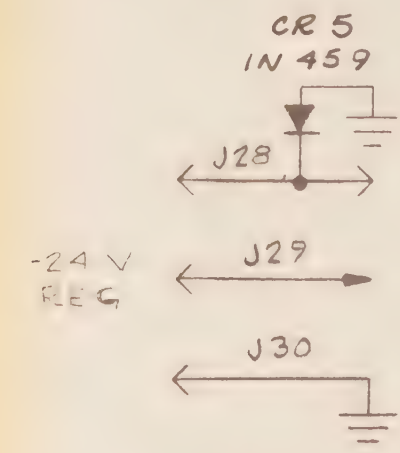
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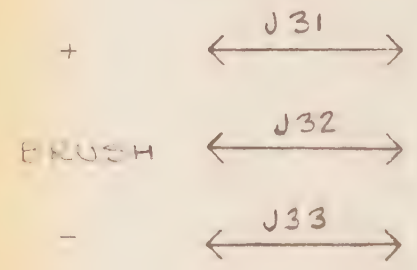
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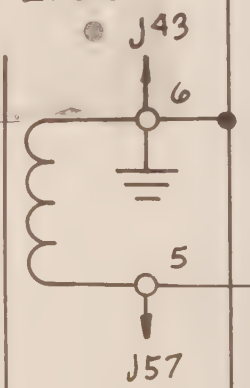
PEN 2 LIFT COIL



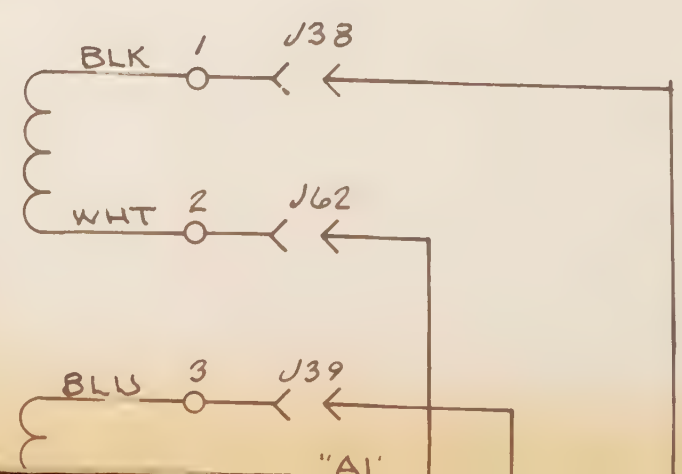
PEN 2 MANDREL



T3
B00 684 2390



(B1)



G

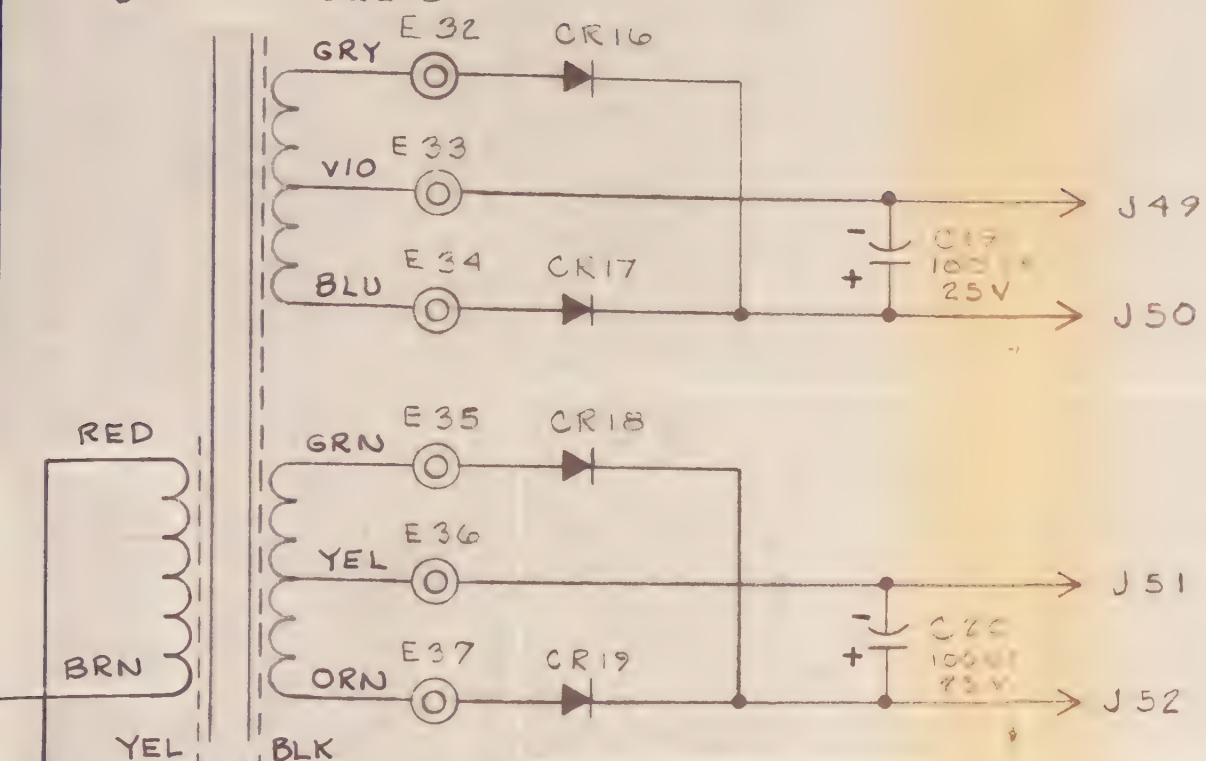
H

I

J

K

T5
B00 684 222 0



PEN #1

PEN #2

YEL BLK

T4



ARM



TIME

WHT BLK

B00 684 222 0

RIC
TO 10W

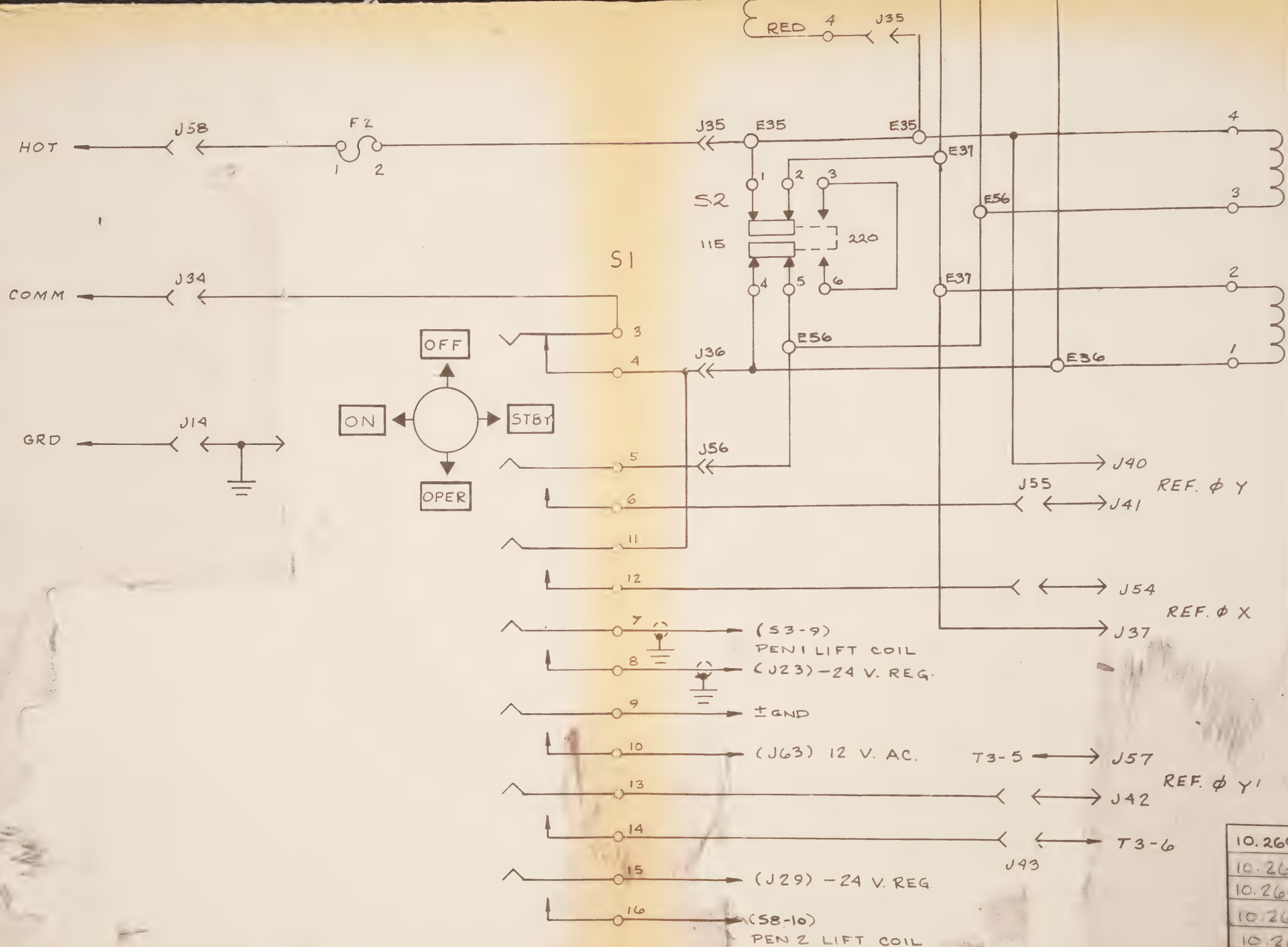
J53 → J44 - 24V. UNREG. (LIGHTS)

NOTES

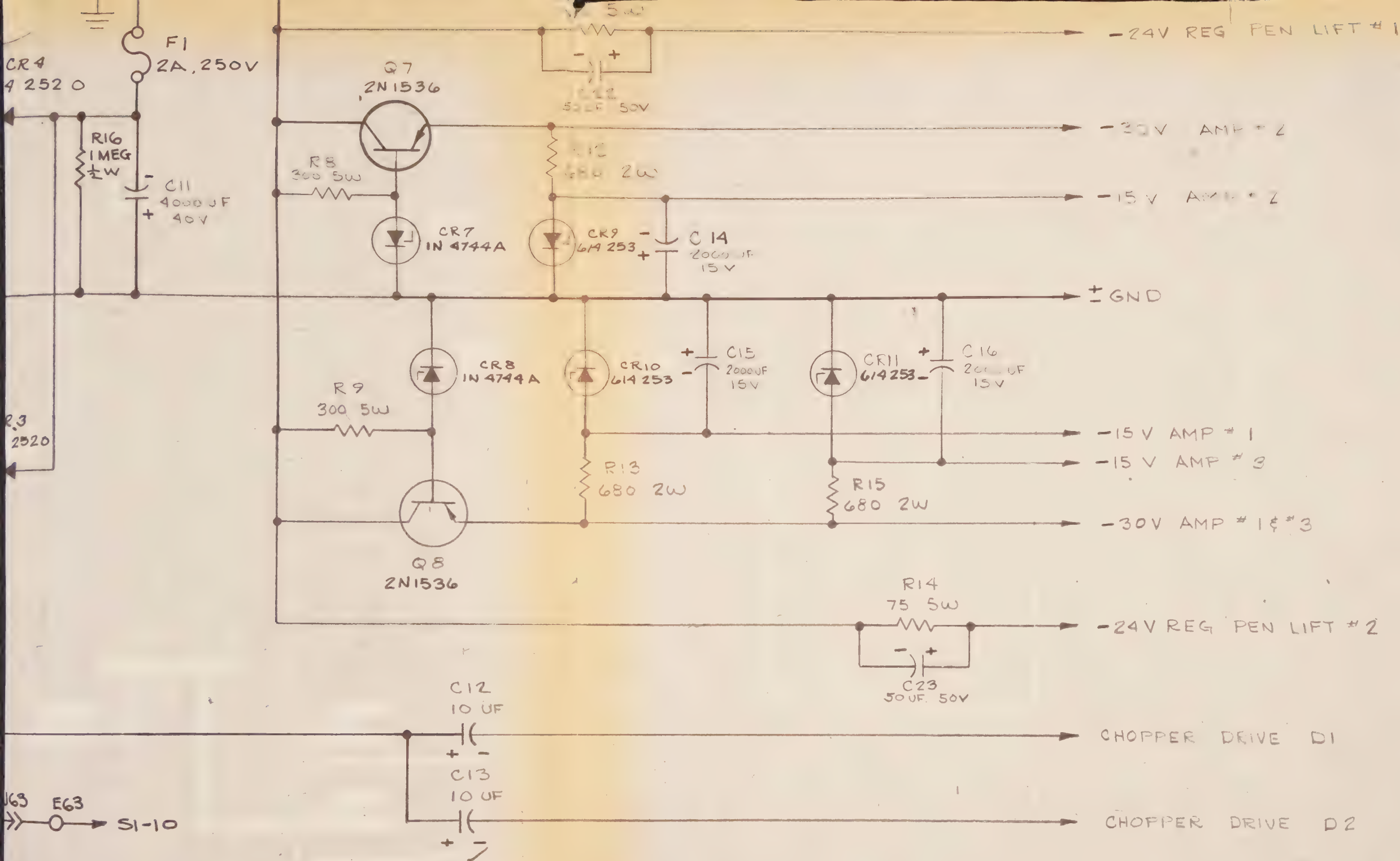
1. UNLESS OTHERWISE SPECIFIED
ALL DIODES ARE 614 268 0

RELEASED FOR PRODUCTION:	ENGR	DATE	APPV'D
	WLB	13 SEPT 66	
NO.	REVISIONS		
9	REDRAWN FOR REDESIGN & CLARITY YAVOR 13 SEPT 66 ECN 592, 609, 611, 692, 700, 703, 708		
10	IN AREA B4 COLORS OF WIRES ON TERMINALS 1&2 WERE REVERSED. IN AREA C4 COLORS ON TERMINALS 1&2 WERE REVERSED AND 3 & 4 WERE REVERSED. WA 9 NOV 66 ECN 838		
11	SHT 2 WAS REV 1 REDRAWN FOR REDESIGN PER ECN 546, 644, 757, 809, 915 1007, 1013 & 1027. 1217 3 PHILLIPS 31 JUL 67		
12	SHT 2 WAS REV. 2 C.YAVOR 18 SEPT 67 ECN 1295		
13	SHT 2 WAS REV. 3 C.YAVOR 12 OCT 67 ECN 1280, 1336		
14	C27, 10UF, 10V WAS SPEC IN AREA B5. NEG. END TO J21, POS. END TO GRD. SHT 2 WAS REV. 4. C.JENSEN 31 JAN 68 ECN 1390, 1440, 1524		

5



10.260-4	010 260 45
10.260-3	010 260 35
10.260-2	010 260 25
10.260-1	010 260 15
10.260	010 260 05
UNIT NUMBER	SCHEMATIC NUMBER



010 260 4P	AS SHOWN WITH ALL COMP.	00 099 663 1P	19026
010 260 3P	VARIATION SUP. SER. BY 10.349-0	00 099 663 1P	58007
010 260 2P	" " " " 10.349-1	05 099 663 1P	58015
010 260 1P	" " " " 10.349-0	09 099 663 1P	19026
010 260 0P	" " " " 10.349-1	09 099 663 1P	19026
PARTS LIST & NEXT ASSY.	DESCRIPTION	PARTS LIST USED ON:	PROJECT NUMBER
TABLE OF UNIT NUMBERS			

MATERIAL: SEE TABLE

FINISH: _____

UNLESS OTHERWISE SPECIFIED		
DIMENSIONS ARE IN INCHES		
CAPACITANCE IS IN pF		
RESISTANCE IS IN OHMS		
TOLERANCE ON		
FRACTIONS	DECIMALS	ANGLES
± 1/64	± .005	±
*TOL. OF MATERIAL SUPPLIED		

DRAWN	SP
E. WHITEHEAD	31 Jul 67
CHKD	3P
WLB	31 Jul 67
DSGR	SP
S. PHILLIPS	31 Jul 67

DWG. NO. WAS: _____	
USED ON: SEE TABLE	
DATE	RCDR
31 Jul 67	
DATE	REVWD
31 Jul 67	ACERRA
DATE	APPVD
31 Jul 67	8P

SIMILAR UNITS	
ELECTRONIC ASSOCIATES, INC.	
LONG BRANCH, NEW JERSEY	
SCHEMATIC	
POWER SUPPLY & SERVO AMPL.	
(1120, 1121, 1130, 1131)	
SHT. NO.	2
SIZE	D
REV. NO.	5
PROJECT	19026
D00 010, 0260 05	
SHEET 1 OF 2 SHEETS	

A

B

C

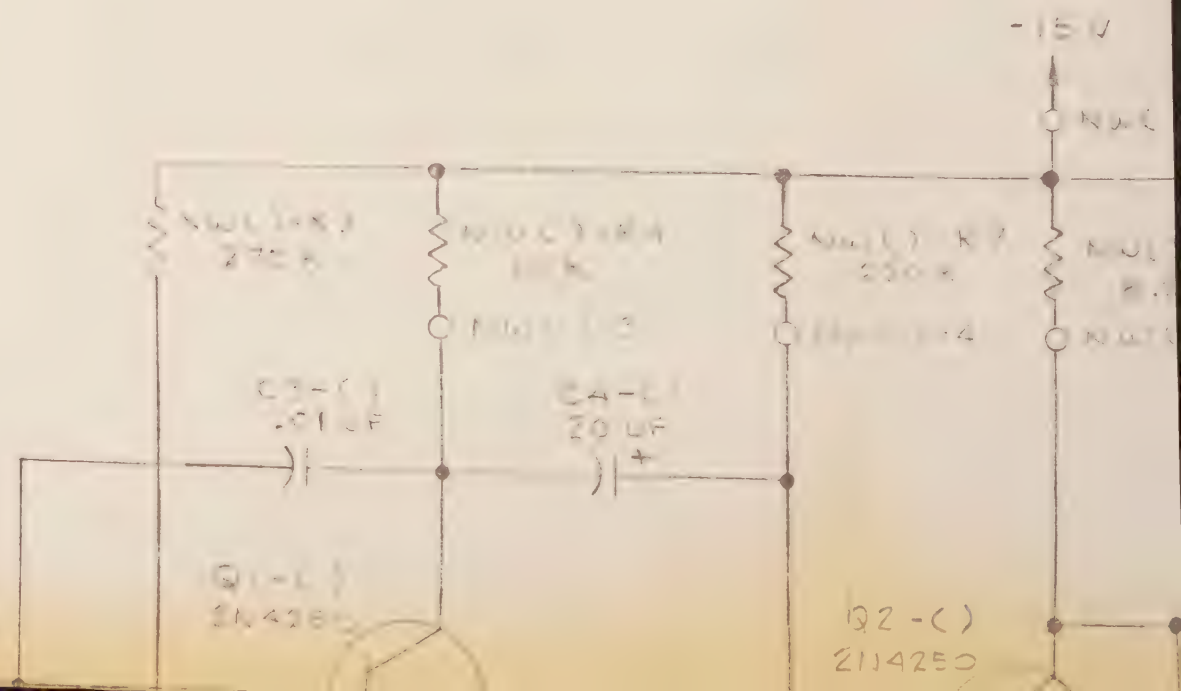
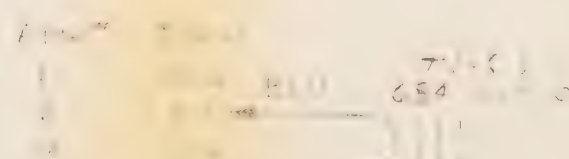
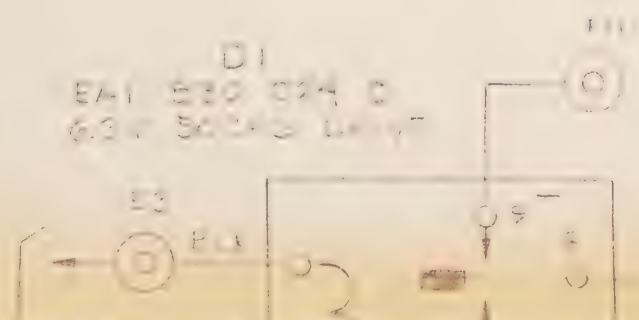
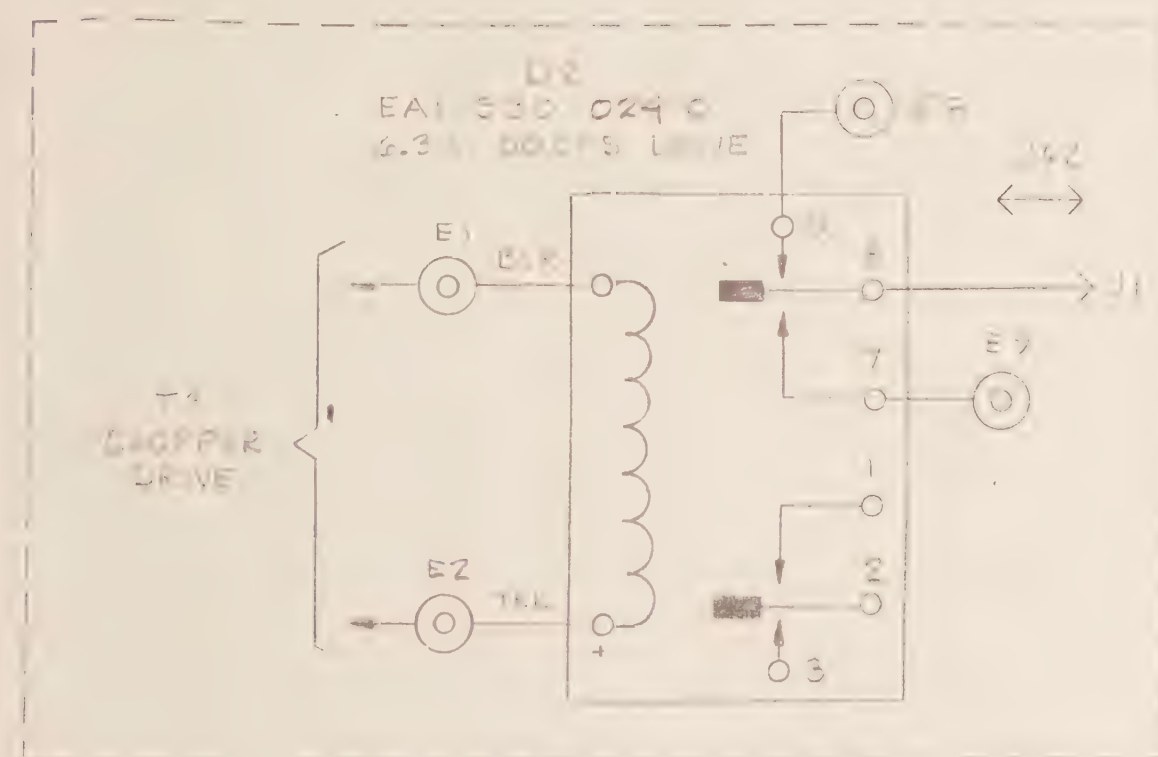
D

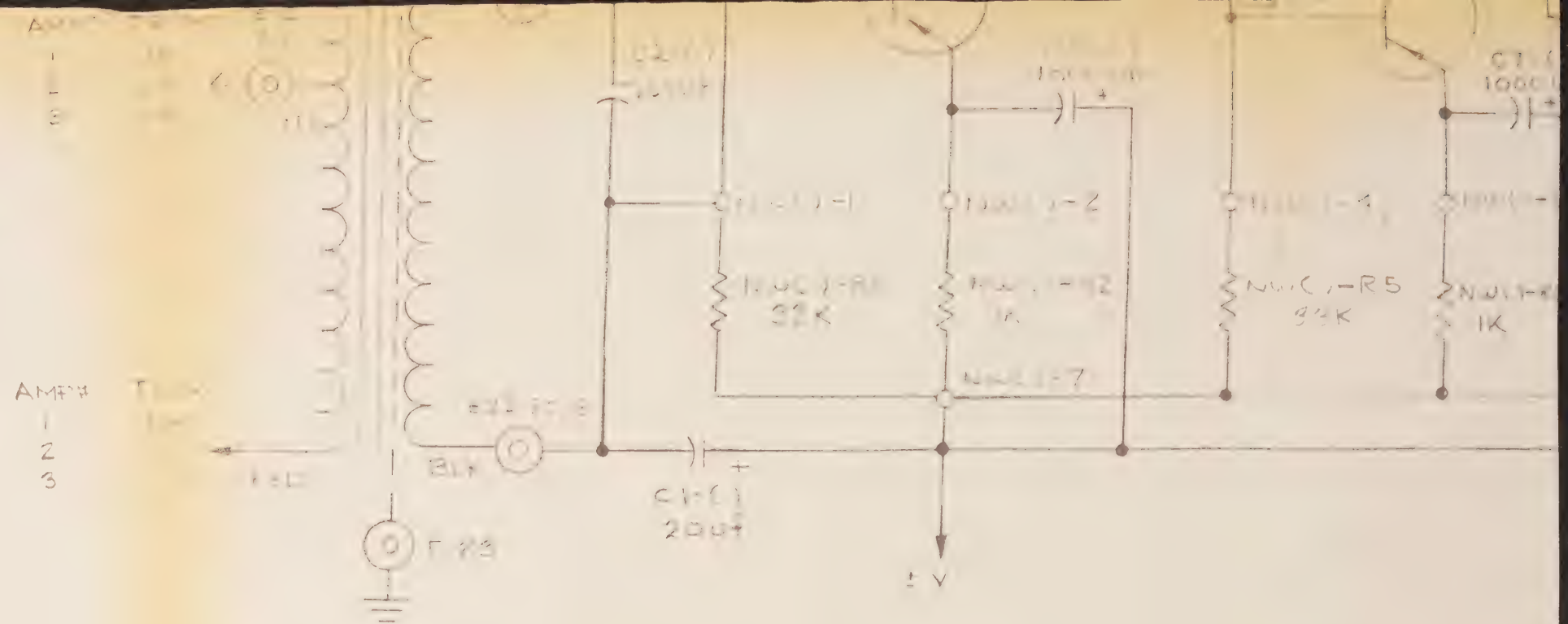
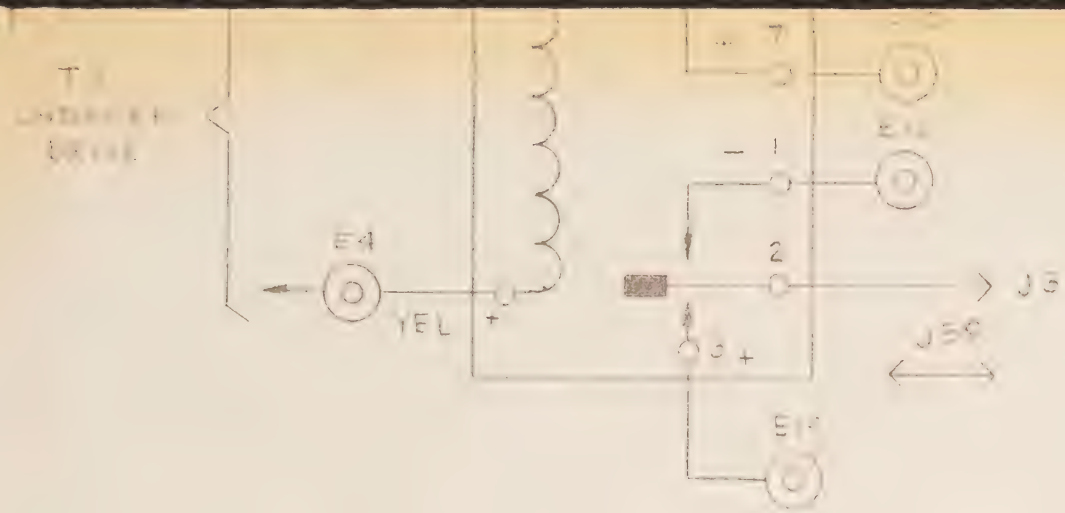
E

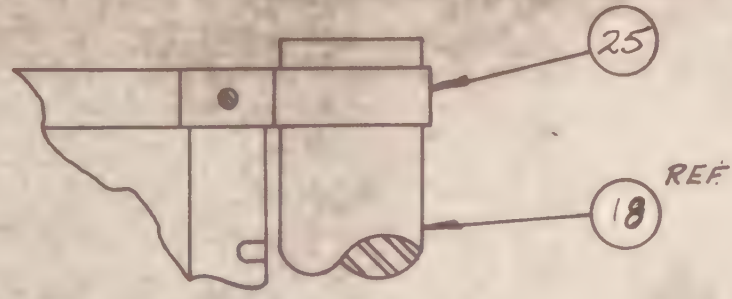
7

6

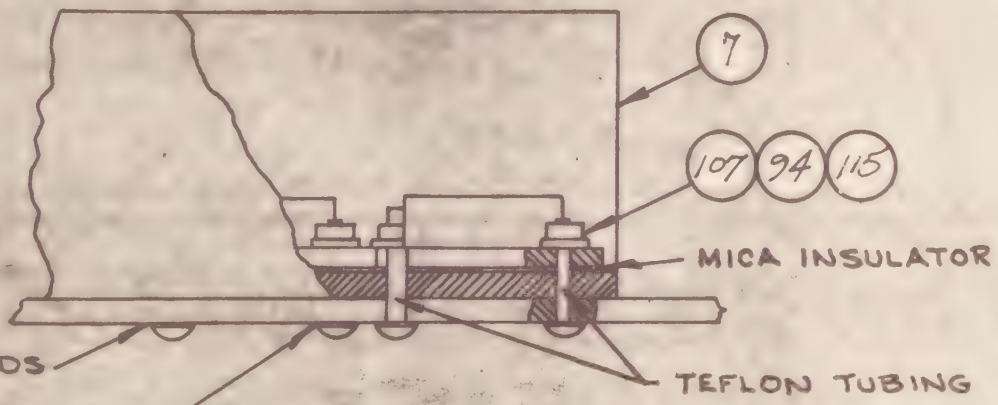
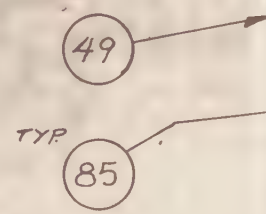
5







VIEW A
(SCALE 1:2)

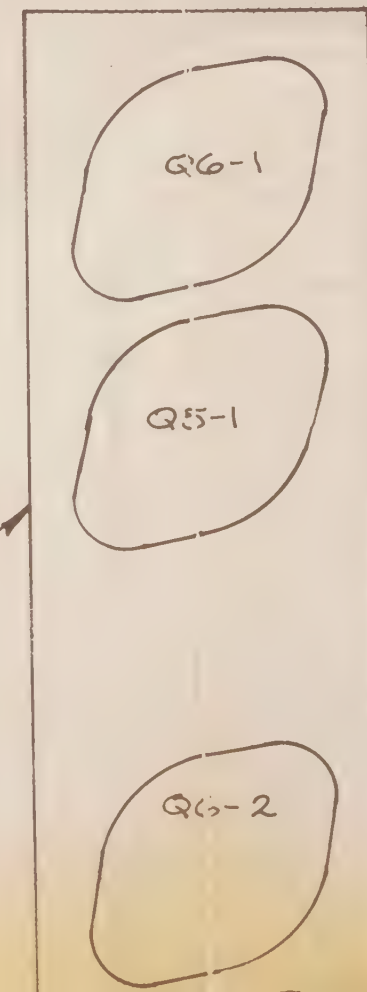
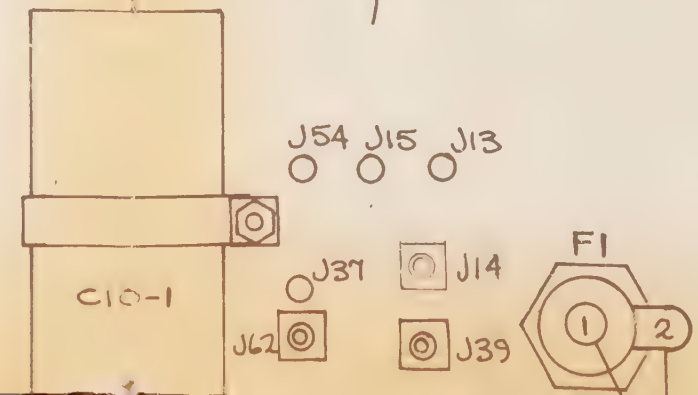
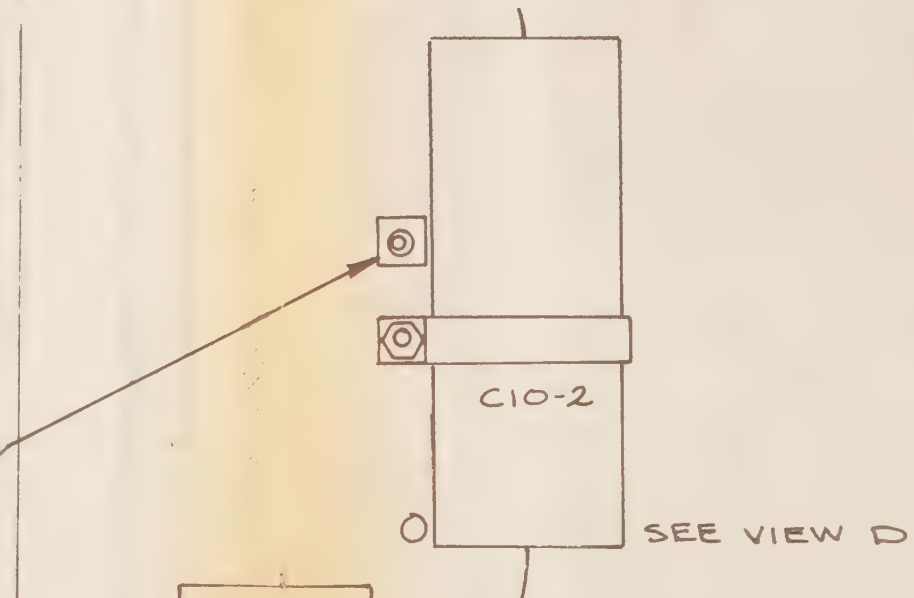
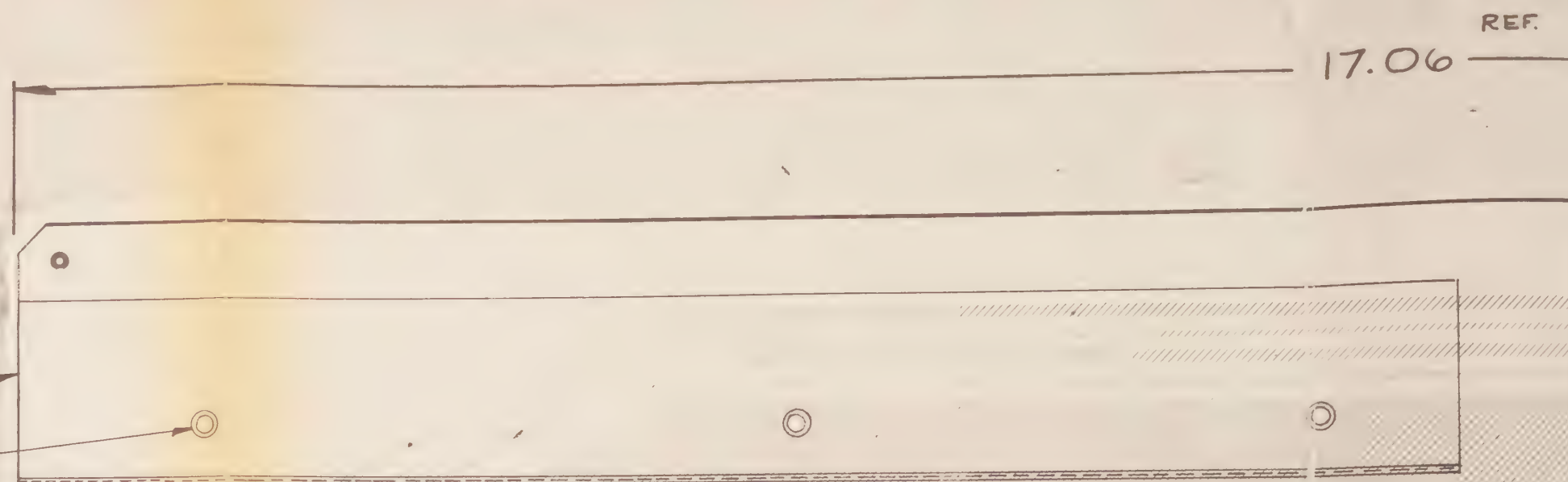
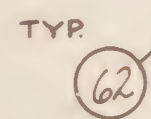


SCREW HEADS NOT TO BE SOLDERED TO COPPER

98 — PLACE BETWEEN SCREW HEAD AND 30V COPPER CONDUCTOR ONLY

TYPICAL POWER TRANSISTOR AND HEATSINK MOUNTING FOR Q5 AND Q6

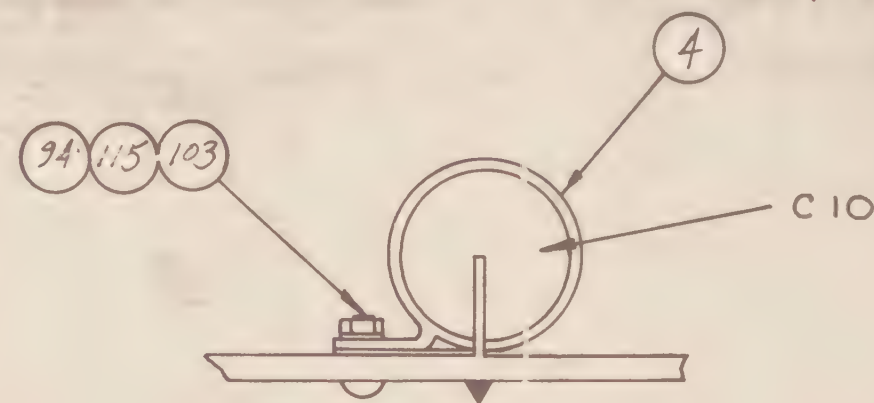
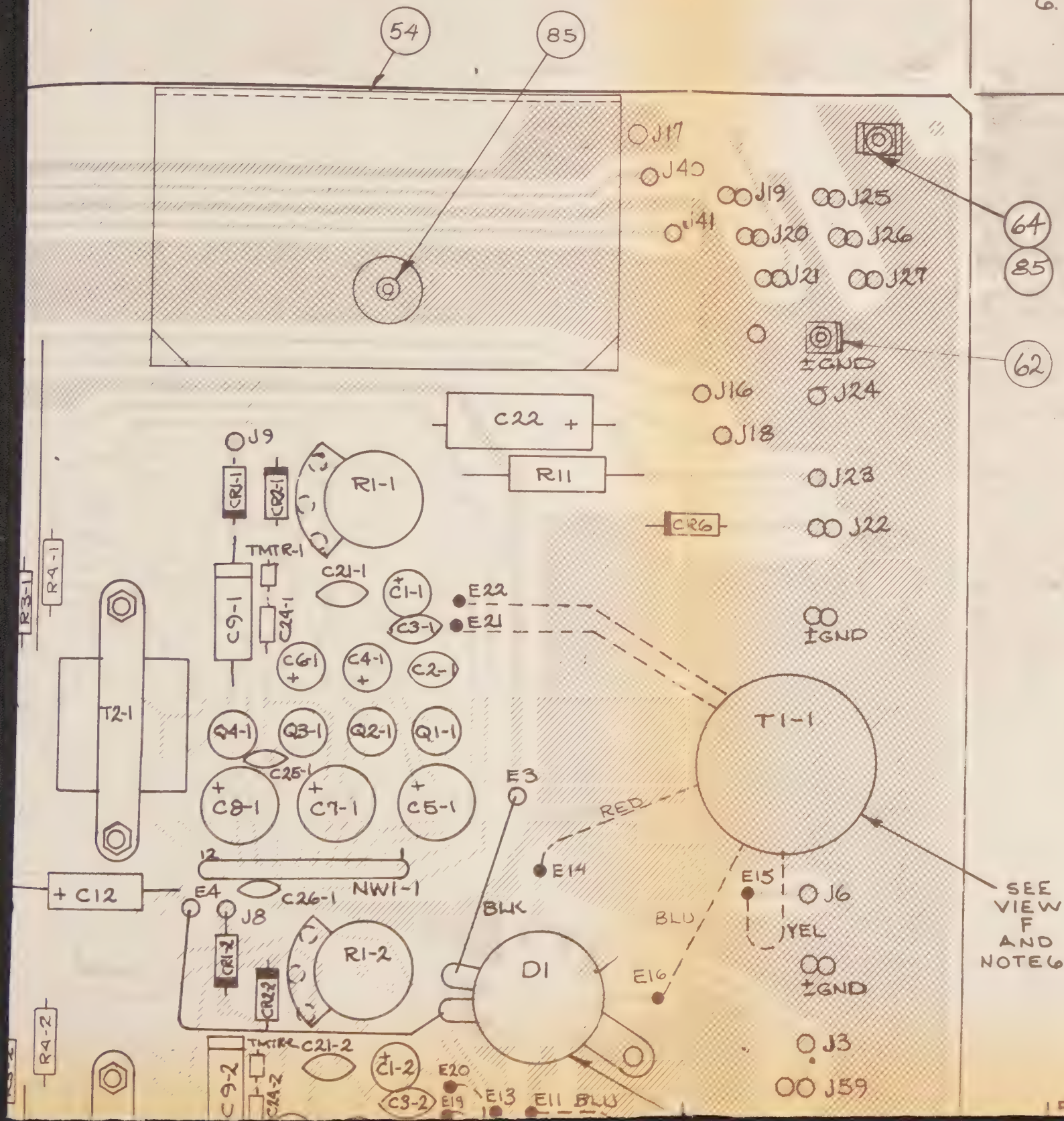
VIEW B



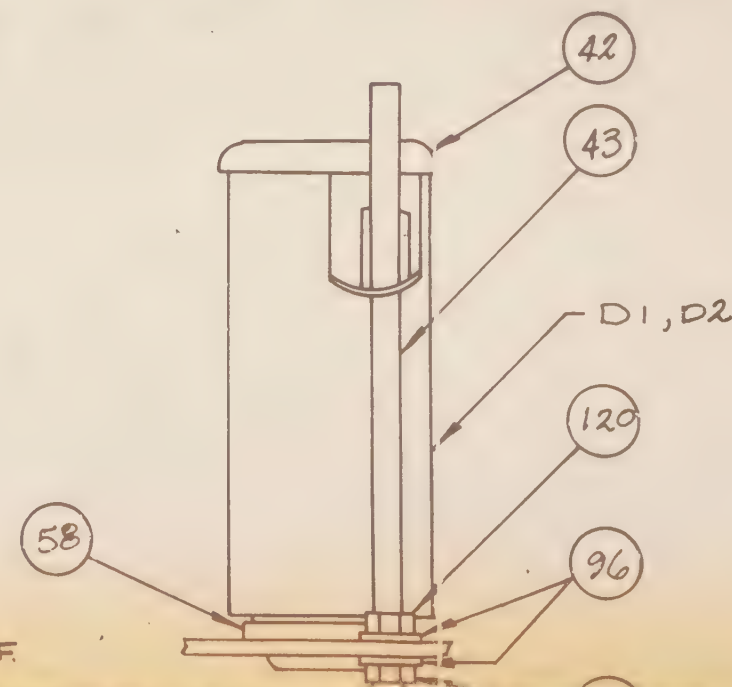
REF. 17.06

NOTES:

1. RUBBER STAMP MODEL NO. AND SERIAL NO. IN AREA PROVIDED ON CARD.
2. JUMPERS TO BE #22 SD-BUS # COVERED WITH TEFLON TUBING.
3. TRANSFORMERS T2, T4 & T5 TO BE MOUNTED WITH ITEMS 145, 157 AND 162
4. MOUNT ALL SCREW HEADS ON COPPER SIDE
5. COIL LEADS FROM D1 TO BE 4 1/2" LONG.
6. TWIST BLUE, RED & YELLOW WIRES TOGETHER AND TWIST BLACK & GREEN WIRES TOGETHER ON T1-1 AND T1-2 TRANSFORMERS.



TYPICAL MOUNTING FOR C10
VIEW D



SEE VIEW F AND NOTE 6

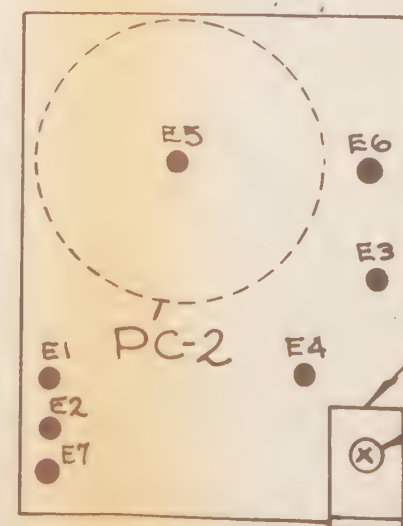
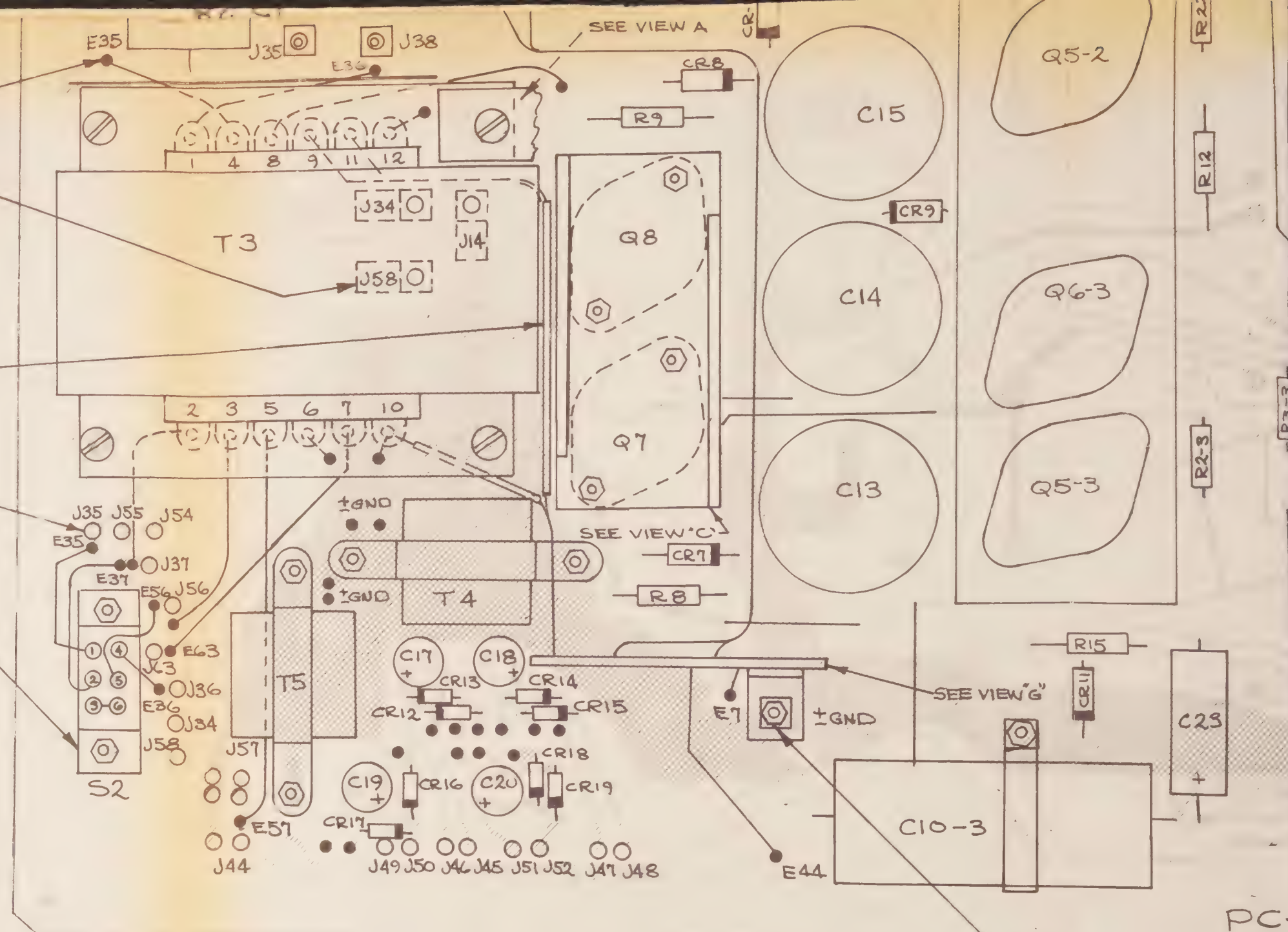
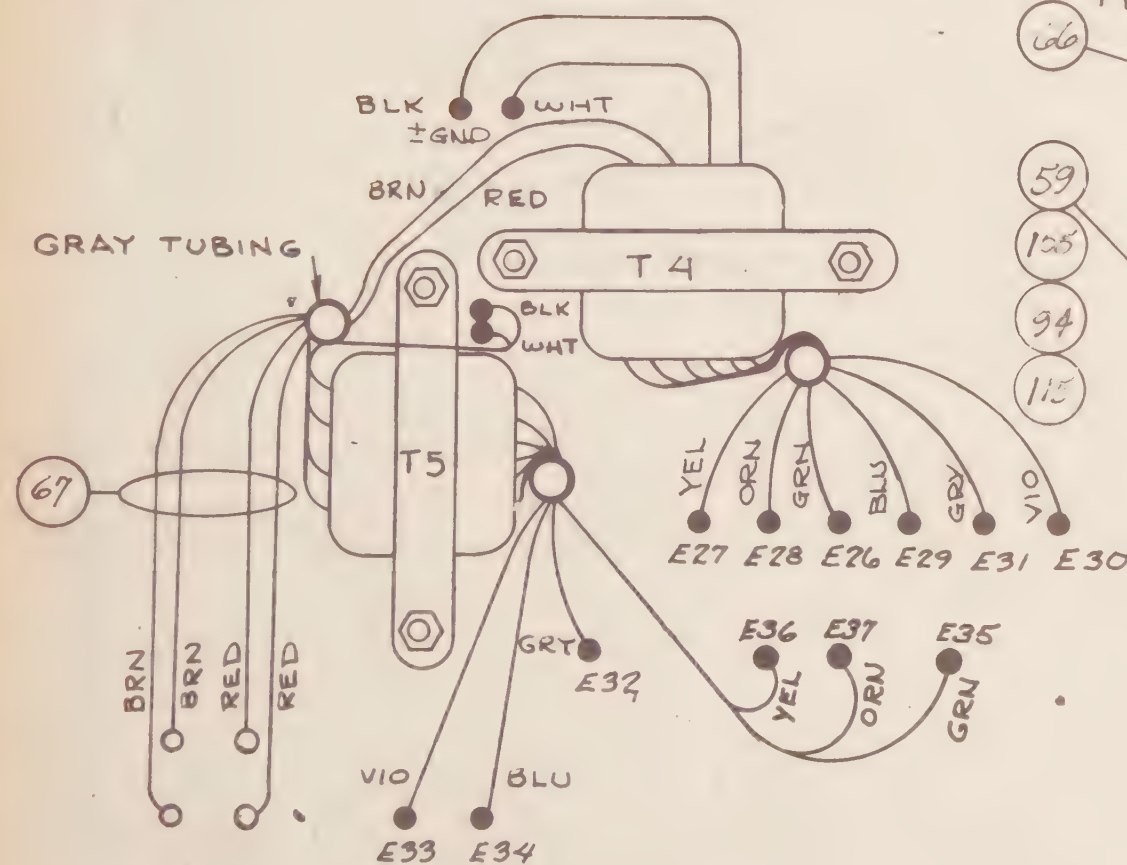
RELEASED FOR PRODUCTION:	ENGR	DATE
NO.	REVISIONS	APP'V
14	REDRAWN FOR REDESIGN 546, 444, 757, 809, 915 1007 1013, 1027 & 1217, 777. 5 PHILLIPS 1 Aug 67	
15	IN AREA C6, ITEMS 49 & 85 WERE NOT SPEC. IN AREA H7. + END OF C27 WAS MOVED .75 TO THE RIGHT. AREA F2 WAS SHOWN: J30 J11 J43 J28 J42 J31 J29 MINOR COPPER CHANGES TO AGREE WITH D00 158 06370. IN AREA G7, ITEMS 54 & 85 WERE NOT SPEC. C. YAVOR 18 SEPT. 67 ECN 1272, 1292, 1295, 1320, 1321	
16	IN AREA H5, E14, RED WAS SPEC E16 BLU & E16 BLU WAS SPEC E14 RED. IN AREA F3, H5, R4 () WAS SPEC. BETWEEN Q3 () AND T2 () TERMINAL 3. C. YAVOR 12 OCT. 67 ECN 1280, 1336	
17	IN AREA H7, C27 WAS SPEC. BETWEEN J21 & J17. J17 WAS SPEC UNDER J41. GRD TAB ITEM 62 WAS SPEC ITEM 64. IN AREA D4, J14 GRD TAB AND JUMPER WIRE WERE NOT SPEC. C. JENSEN 31 JAN 68 ECN 1324	

POWER TRANSISTOR AND HEATSINK
MOUNTING FOR Q7 AND Q8

VIEW C

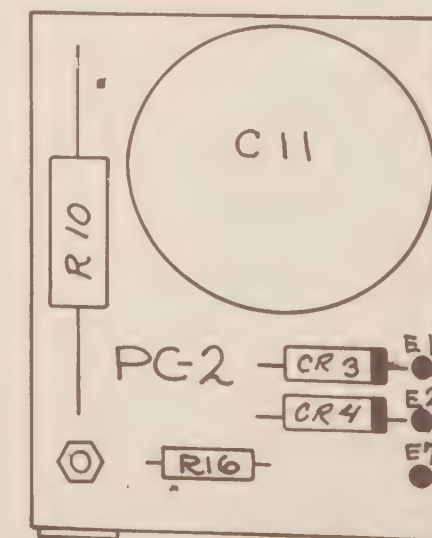
SCREW HEADS
NOT TO BE
SOLDERED TO
COPPER

GRY
TUBING



COPPER SIDE

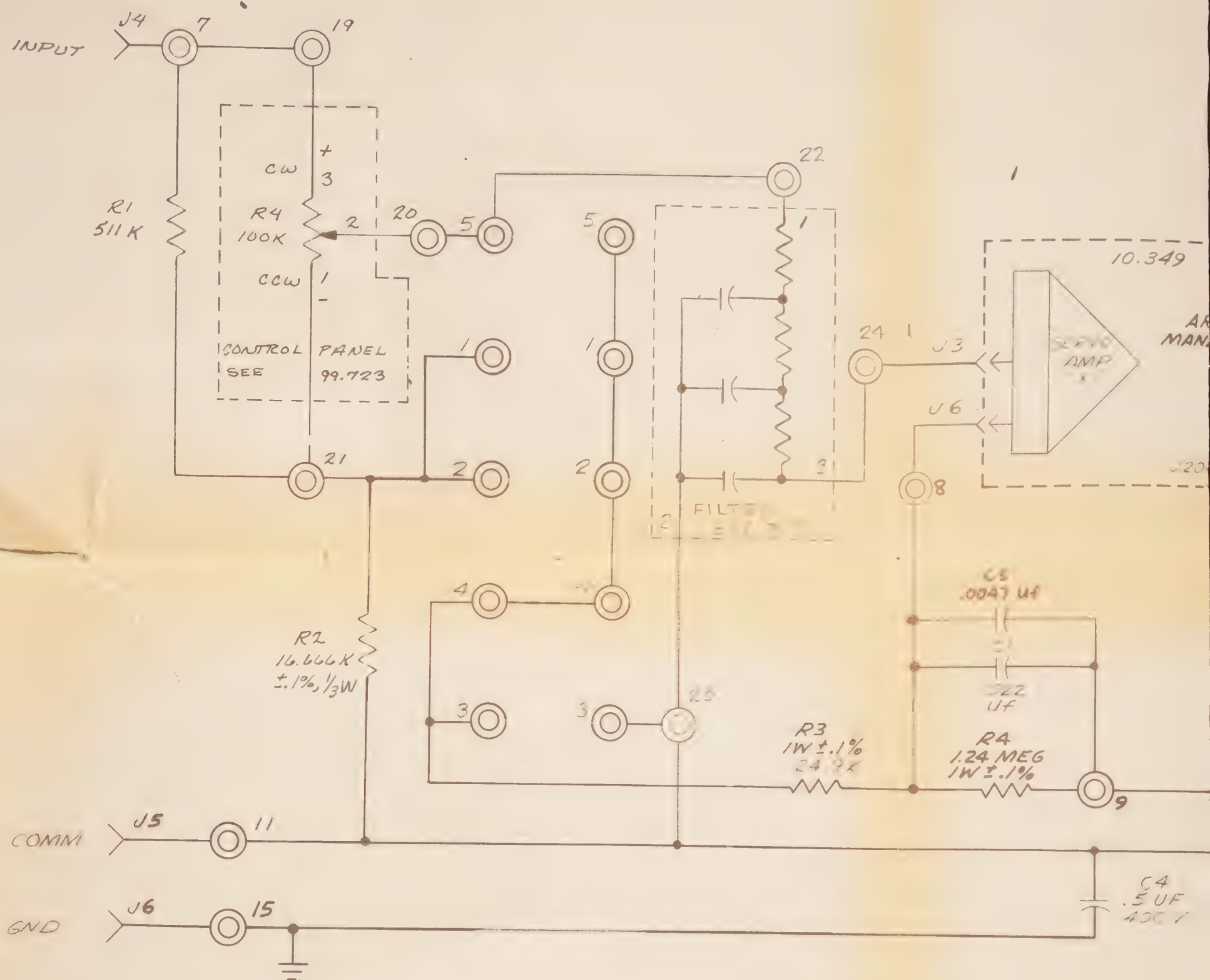
VIEW G

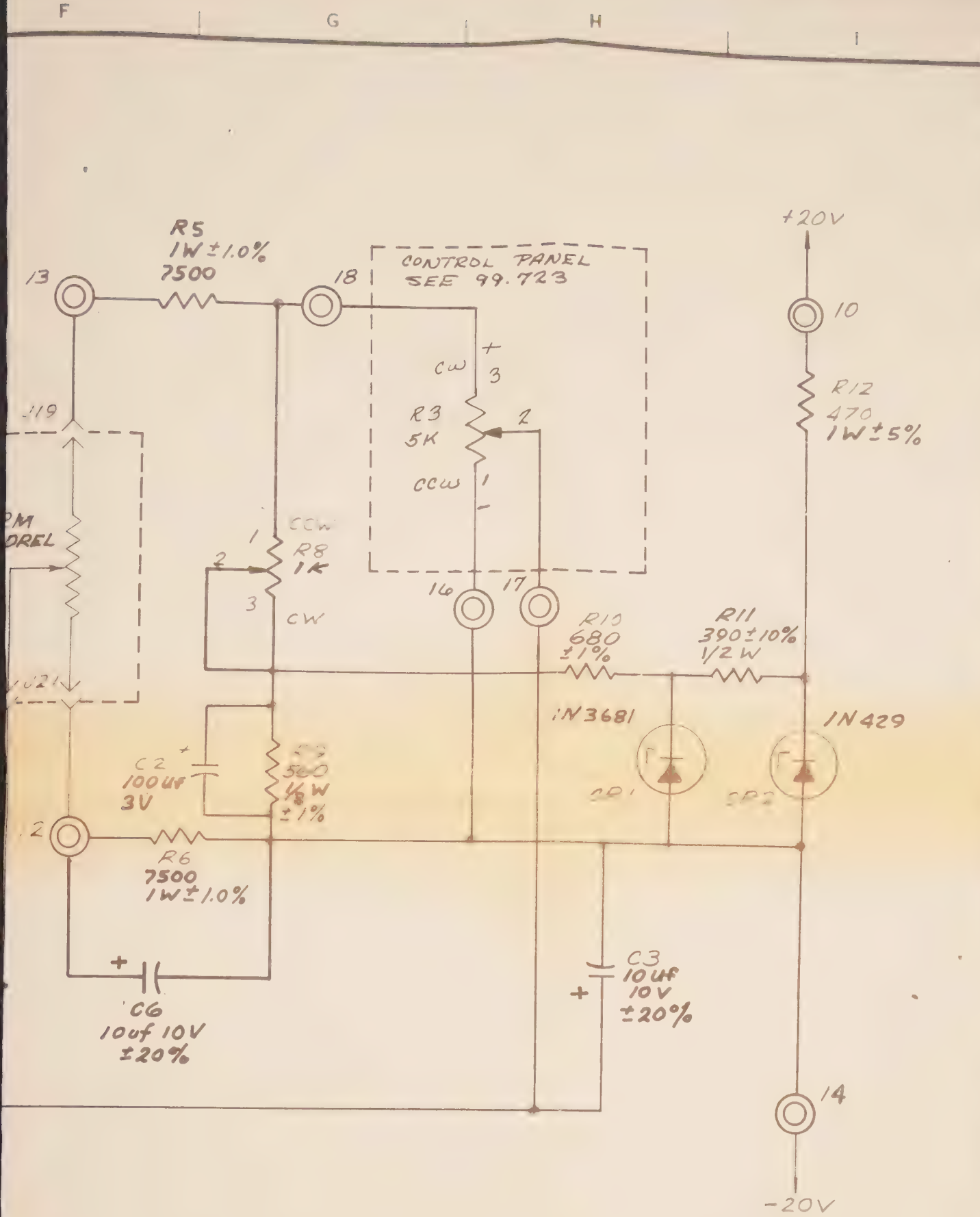


COMPONENT SIDE

10.260-4	00 010 0260-4
10.260-3	00 010 0260-3
10.260-2	00 010 0260-2
10.260-1	00 010 0260-1
10.260	000 010 0260
UNIT NUMBER	ASSEMBLY NUMBER

SHEET / OF / SHEETS





NOTES: UNLESS OTHERWISE SPECIFIED.
 1. ALL RESISTORS ARE 1/2 W.
 2. C1 CAPACITOR IS A MATCHED PAIR WITH C1 ON CORRESPONDING PEN REFERENCE NETWORK, 12.167%

NO.	REV. NO.	DATE
1	1	14 DEC 67

ELECTRONIC ASSOCIATES, INC.
 LONG BRANCH, NEW JERSEY

SCHEMATIC
 NETWORK REFERENCE
 (ARM)
 (1132 VARI PLOTTER)

SHT NO.	
SIZE	
REV. NO.	
PROJECT	345021 C00 012 1671 OS
SHEET 1 OF 1 SHEETS	

MATERIAL: SEE PART LIST A

FINISH: _____

UNLESS OTHERWISE SPECIFIED

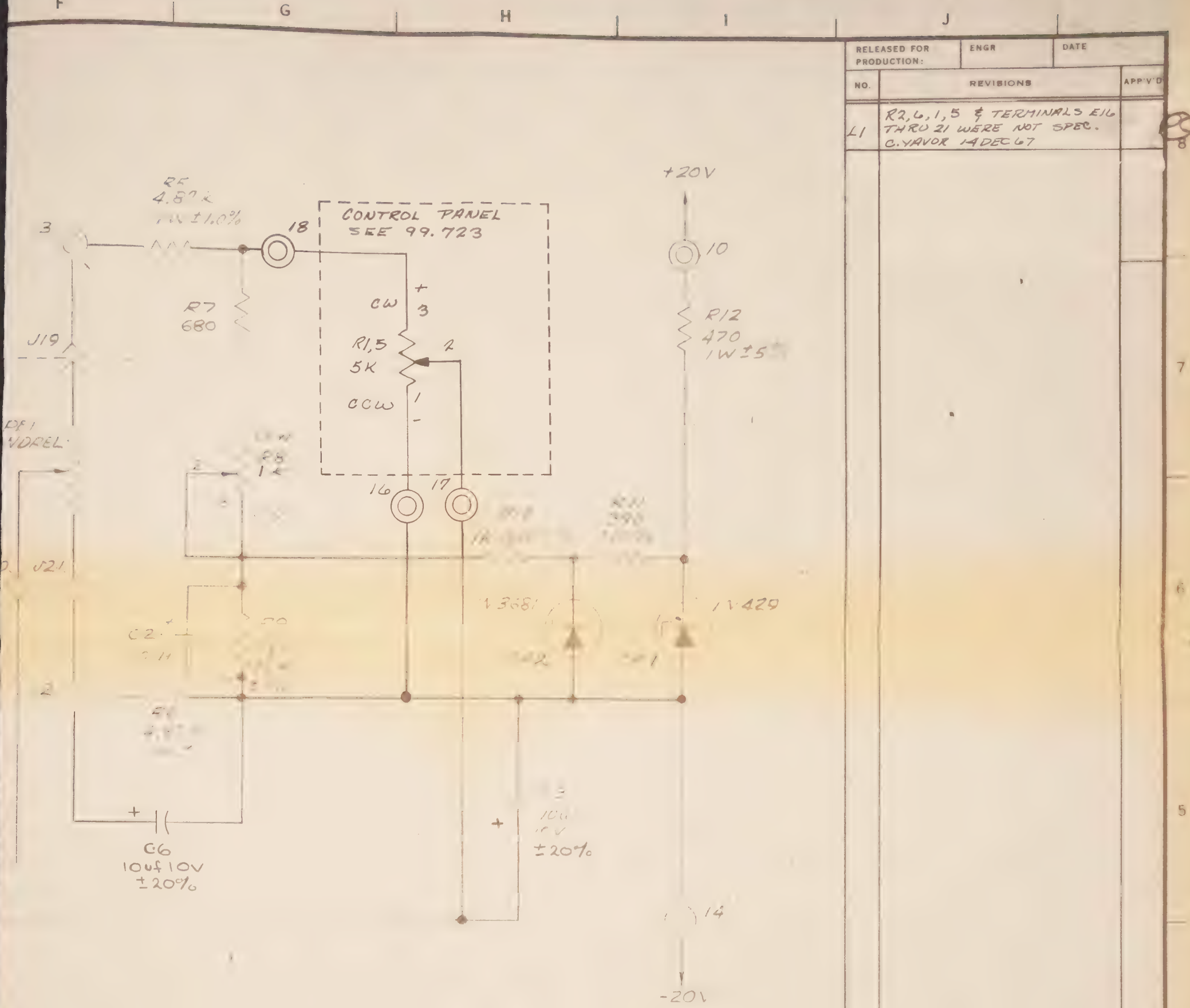
SCALE: _____

DATE: 9 NOV 67

DESIGN: S. PHILLIPS

TOLERANCE OF: X = ± 03, YXX = ± 015, Z = ± 005

* TOL. OF MATERIAL SUPPLIED

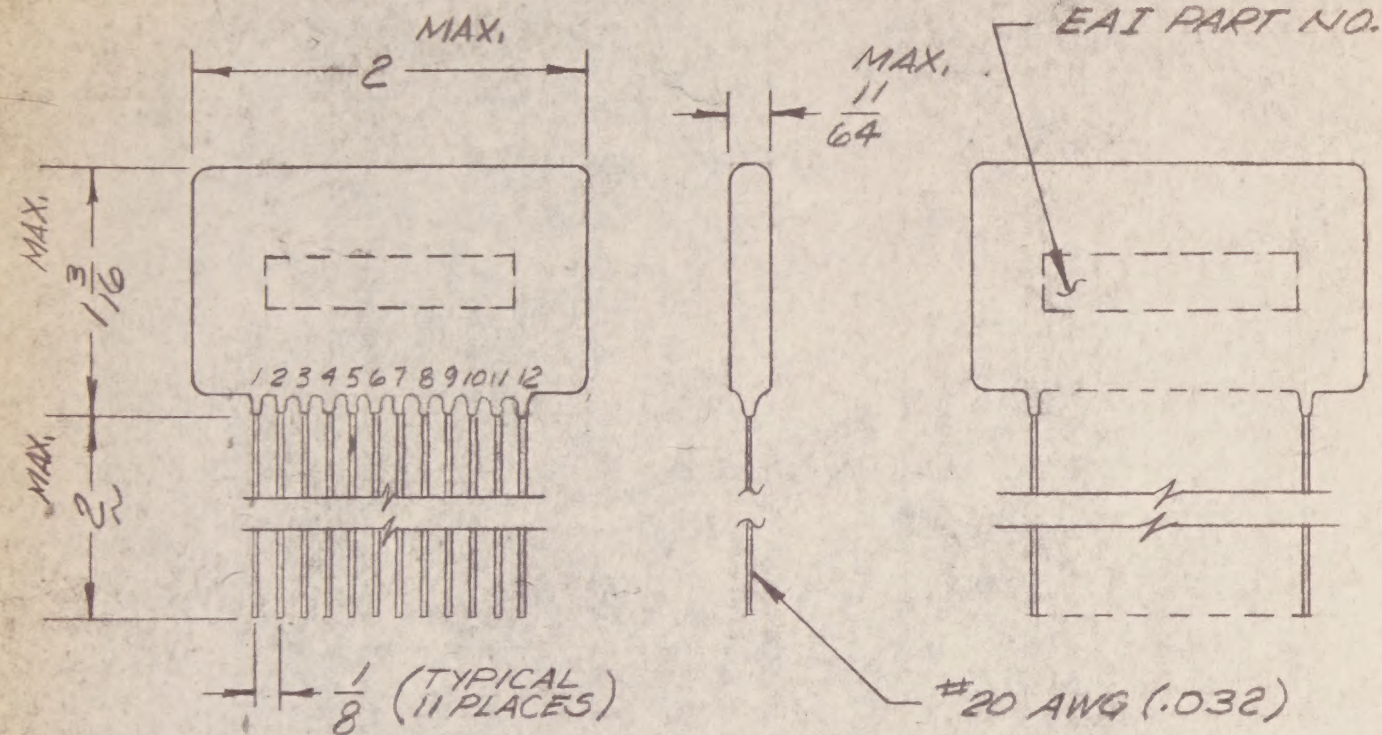


NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE 1/2 WATT
2. CI CAPACITOR IS A MATCHED PAIR
WITH C1 ON CORRESPONDING ARM
REFERENCED I.F.I. WORK, 12.1671

RELEASED FOR PRODUCTION:		ENGR	DATE
NO.	REVISIONS		APPROV'D
L1	R2, 6, 1, 5 & TERMINALS E16 THRU 21 WERE NOT SPEC. C.YAVOR 14 DEC 67		

ELECTRONIC ASSOCIATES, INC. LONG BRANCH, NEW JERSEY	
SCHEMATIC NETWORK REFERENCE (PEN) (1132 VARI PLOTTER)	
SHT. NO.	
SIZE	
REV. NO.	
PROJECT	C00 012 1672 05
SHEET 1 OF 1 SHEETS	

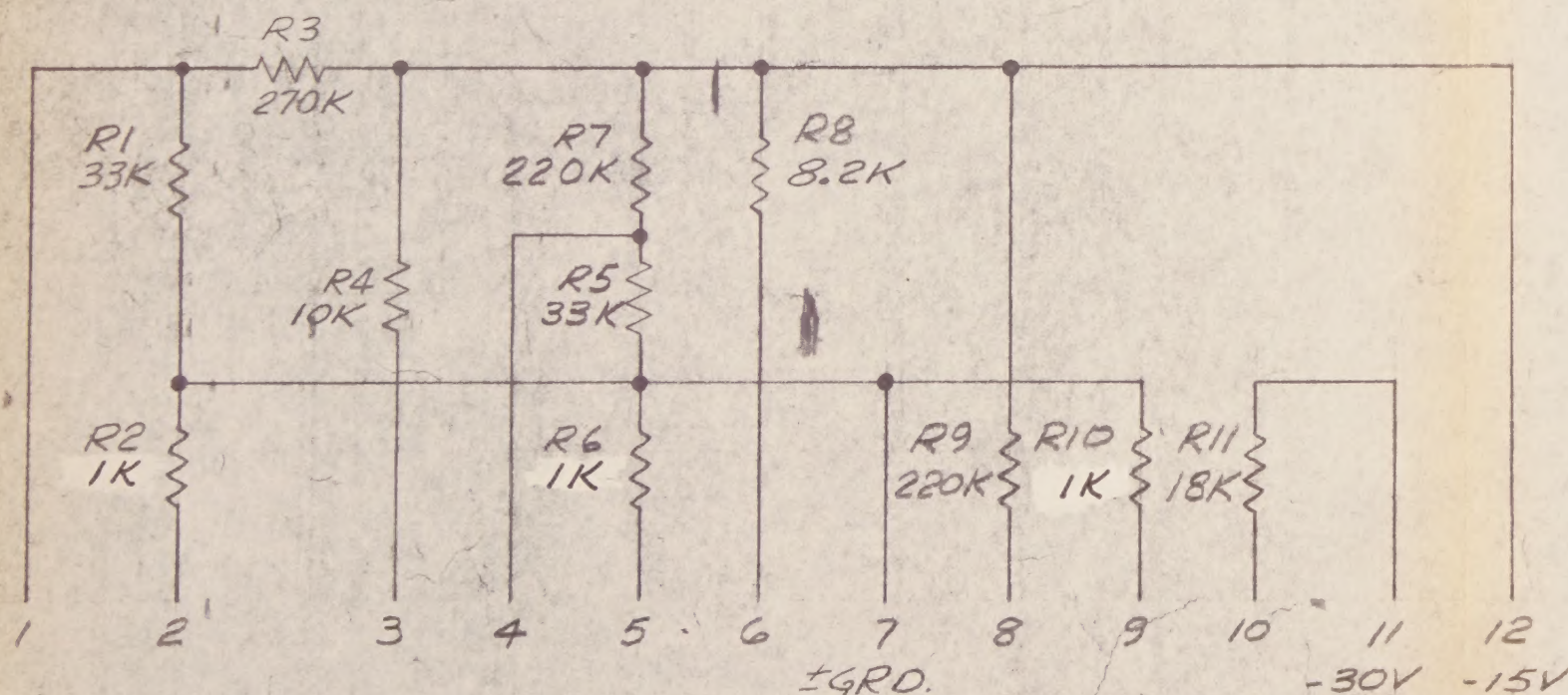
MATERIAL:		DWG. NO. WAS	
FINISH:		USED ON: 12 1672 OP	
UNLESS OTHERWISE SPECIFIED		SCALE	
DIMENSIONS ARE IN INCHES		DRAWN	DATE
CAPACITANCE IS IN pF		CHKD	DATE
RESISTANCE IS IN OHMS		DSGR	DATE
TOLERANCE OF: .X = ± .03 .XX = ± .02		DATE 9 NOV 67	APPROV'D
.XXX = ± .015 .XXX = ± .005 L = ± 1°			
* TOL OF MATERIAL SUPPLIED			



GENERAL DESCRIPTION
CIRCUIT MODULE RESISTOR
NETWORK, CENTRALAB#

ELECTRICAL REQUIREMENTS
1. ALL RESISTORS ARE $\pm 10\%$
0.1 W

NOTE:
1. MARK IN ACCORDANCE W/EAI
BRANDING DWG A 499 011 0



MATERIAL: _____

FINISH: _____

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
CAPACITANCE IS IN pf
RESISTANCE IS IN OHMS

TOLERANCE ON

FRACTIONS $\pm 1/32$ DECIMALS $\pm .005$ ANGLES $\pm$

*TOL. OF MATERIAL SUPPLIED

SCALE 1/1

DRAWN S. Phillips

CHKD

DSGR S. Phillips

DWG. NO. WAS:

USED ON:

A00 010 0349 OP

DATE

DATE

DATE

BCDE

REVWD

APPVD

RELEASED FOR PRODUCTION:	ENGR	DATE
NO.	REVISIONS	APP'V'D
11	MAX. WAS NOT SPEC. S. Phillips 31 Oct 67	
INSTRUMENT DIVISION		
ELECTRONIC ASSOCIATES, INC. LONG BRANCH, NEW JERSEY		
MODULE RESISTOR NET. (1130 VARI PLOTTER)		
SHT. NO.		
SIZE		
REV. NO.		
PROJECT	58007 B 00 592 0135 0	
SHEET 1 OF 1 SHEETS		

MP MASTER



MA30022